Future Drivers:
What will impact the dairy world?

Matthew Smith
Vice President

Alltech®

Demand For Dairy & Alternatives

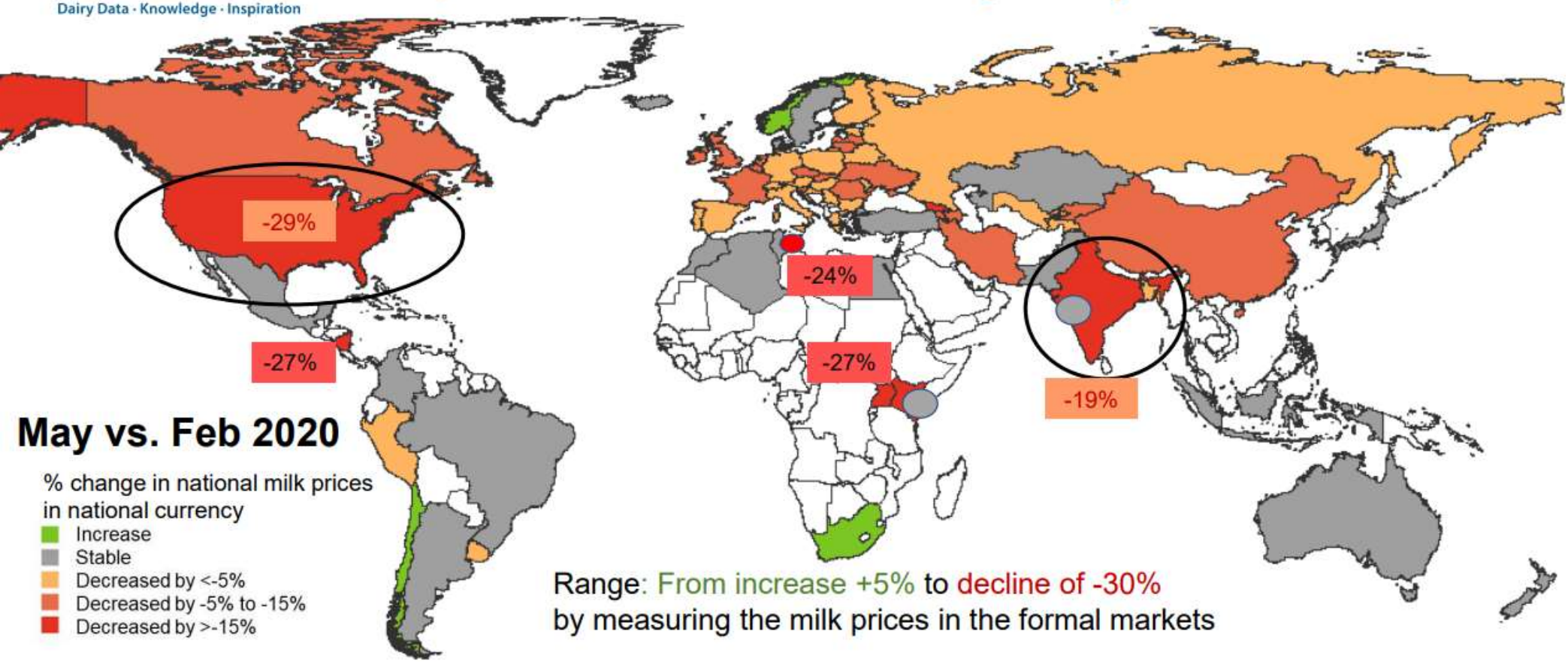
Global Trade & Economy

Climate Change & The Environment

When history books one day recount the COVID-19 pandemic of 2020, it may well be a tale of human ingenuity and adaptiveness.

IFCN
Dairy Data · Knowledge · Inspiration

Depth of the dairy crisis % change of farm gate milk prices; national currency; May vs. Feb 2020



Range: From increase +5% to decline of -30%
by measuring the milk prices in the formal markets

Pandemics

Advanced sanitary measures, traceability and compliance are better achieved by businesses that are **consolidated**

Avian Influenza | African Swine Fever | Foot and Mouth disease | Covid-19 | SARS

A More Sustainable Food Chain


Huge reduction in meat-eating ‘essential’ to avoid climate breakdown
Climate change: Pledge to cut emissions from dairy farms
Stop Eating Meat If You Want To Save The Planet, Scientists Urge
New tools enable farmers to cut cow’s greenhouse gas emissions
Trump: Climate change scientists have 'political agenda'
Avoiding meat and dairy is ‘single biggest way’ to reduce your impact on Earth
Low-emission cows: farming responds to climate warning
Alltech E-CO2

J. Dairy Sci. 99:8477–8485
http://dx.doi.org/10.3168/jds.2015-10695

Development of a noninvasive system for monitoring dairy cattle sleep

J. M. Klefot,* J. L. Murphy,* K. D. Donohue,† B. F. O'Hara,‡ M. E. Lhamon,§ and J. M. Bewley*[1]

Demand For Dairy & Alternatives

Dairy World – 2018 vs 1998

7 t milk produced per farm
(+34 %)

372 mill **dairy cows and buffalos**
(+26%)

2.3 t / milk/ animal/ year
(+29%)

+ 63%
milk produced and consumed
+321 mill t SCM more

116.5 kg ME/capita **milk consumed**
(+26%)

57 mill t ME **milk traded (excl. EU-intra trade)**
(+100%)

334 mill t SCM informal milk
(+77%)

FOOD SECURITY & LESS WASTE


Mindful Choices
Environmentally responsible
Preservation of resources
Fair treatment of workers
Reduction of waste

Availability of non-dairy "milk" – a possible alternative?

- Almond milk
- Rice milk
- Coconut milk
- Soy milk
- Hemp milk
- Oat milk
- Pea milk
- Peanut milk
- Barley milk
- Cashew milk
- Flax milk

Nutritional facts of "milk"

COW'S MILK, 2%
Calories 130
Protein 8g
Fat 5g

ALMOND MILK
Calories 39
Protein 1.5g
Fat 2.8g
May be fortified with Calcium, Vitamin D, Vitamin A, Vitamin E

COCONUT MILK
Calories 45
Protein 0g
Fat 4g
May be fortified with Calcium, Vitamin D, Vitamin A, Vitamin B12

RICE MILK
Calories 113
Protein <1 g
Fat 2.3g
May be fortified with Calcium, Vitamin D, Vitamin A, Vitamin B12

SOY MILK
Calories 80
Protein 7g
Fat 4g
May be fortified with Calcium, Vitamin D, Vitamin A, Vitamin B12, Riboflavin

Average sales price per litre in DE	~1 €	~3 €	~ 6 €	~3 €	~3 €

*Source: NewYork-Presbyterian - https://healthmatters.nyp.org/nutrition-non-dairy/

- Increasing trend/hype in developed regions: Saturated consumers are demanding new types of "milk"
- In terms of nutritional value dairy milk is not replaceable with non-dairy "milk"
- Anti-dairy movements and veganism become more popular

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Source: **Euromonitor*** and own estimates

Global Trade & The Economy

Future Production and Deliveries

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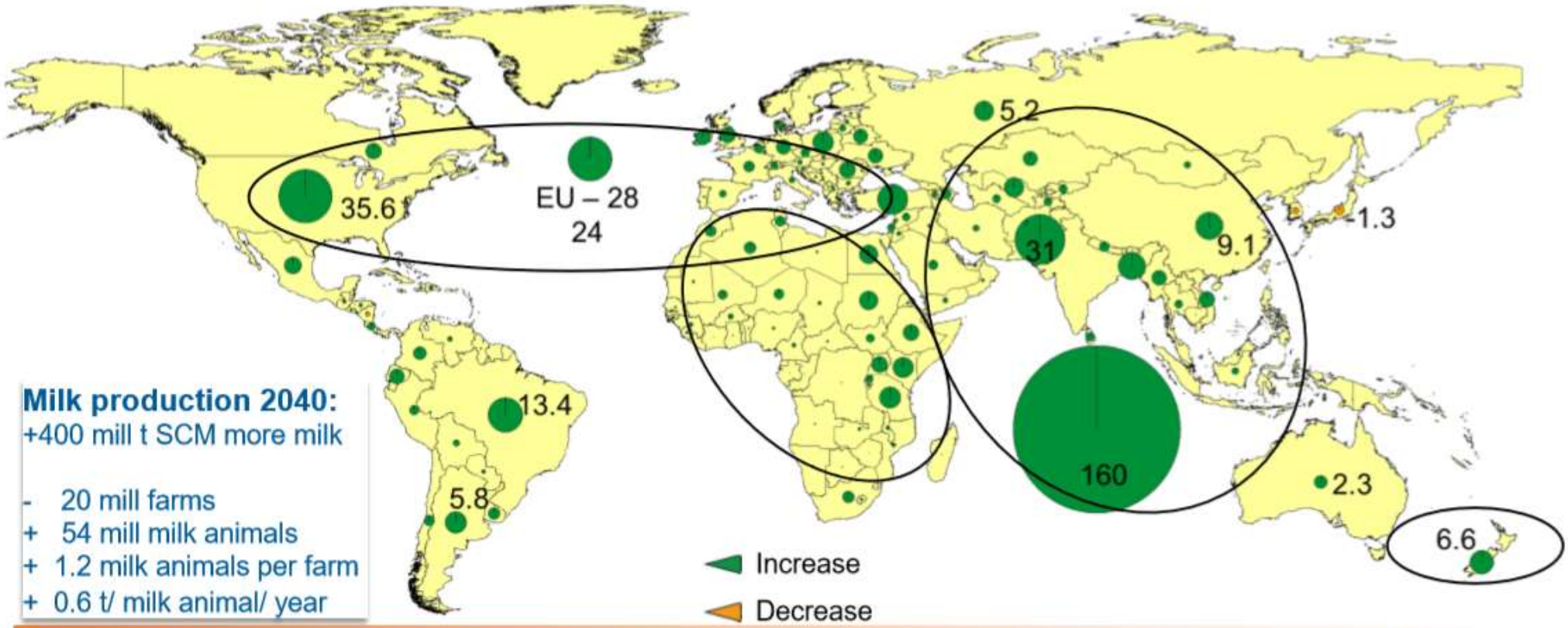
Where will the milk of the future be produced?

World all milk production growth until 2040

Absolute change in all milk volumes 2040 vs 2018 in mill t SCM

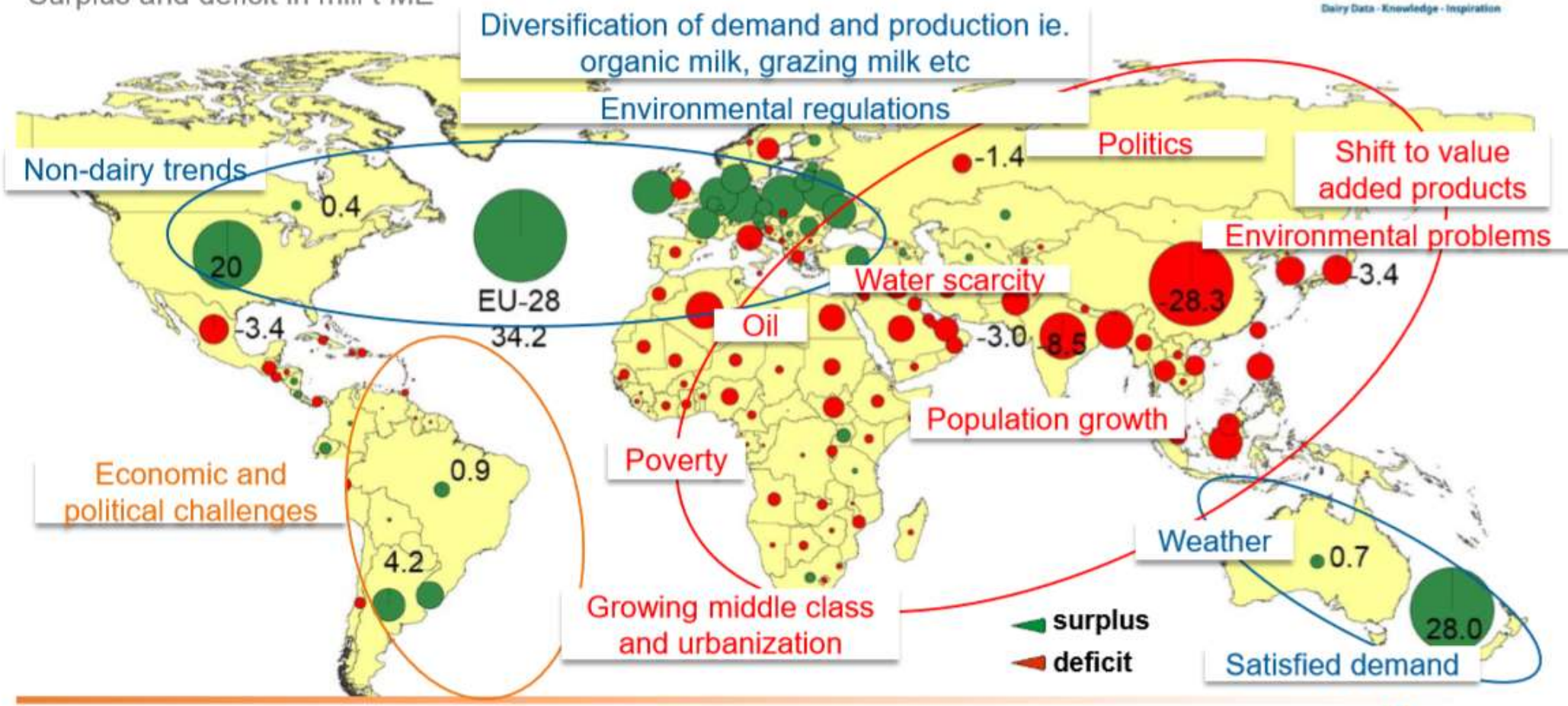


Milk production 2040:
+400 mill t SCM more milk

- 20 mill farms
+ 54 mill milk animals
+ 1.2 milk animals per farm
+ 0.6 t/ milk animal/ year

Challenges and opportunities

Surplus and deficit in mill t ME



EU Green Deal

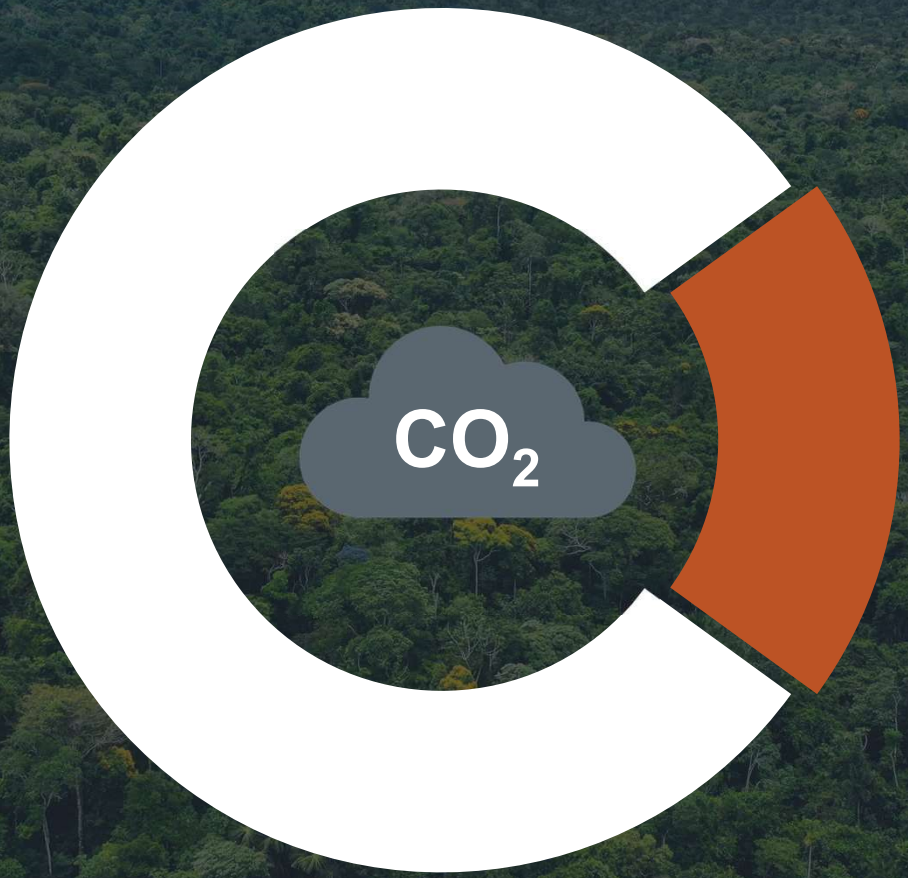
- Europe is committed to **acting now**… and we can expect very significant changes in the next few years
- … and already **making progress.** 14 Major Initiatives since December 2019
- Expect significant and **profound changes** to policy, businesses and society

Agriculture's Greatest Challenge

Climate Change & The Environment

Agriculture

~15% of CO_2e emissions globally



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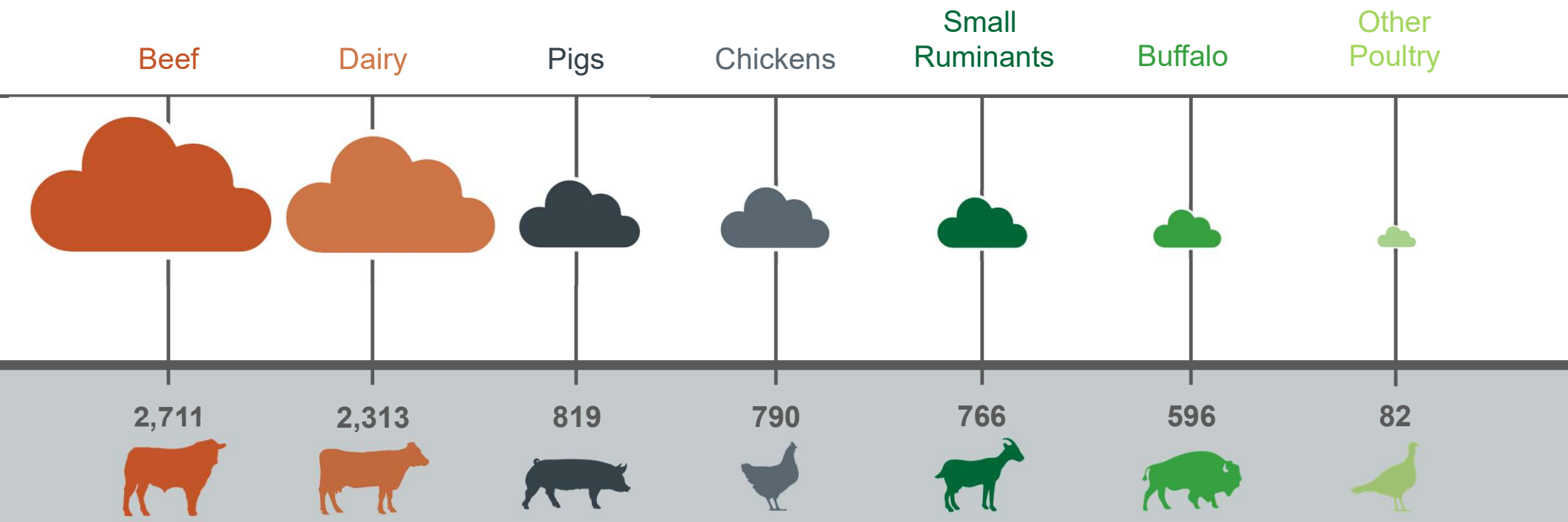
GLOBAL EMISSIONS BY SPECIES



Million Tonnes CO_2e

Source- FAO, 2018

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Alltech®
E-CO_2
INCREASING YOUR PROFIT AND PROTECTING THE ENVIRONMENT

ALLTECH E-CO_2 SERVICES

Pioneering on-farm assessment

Bespoke on-farm and online software

Environmental consultancy

Farm and feed scenario modelling

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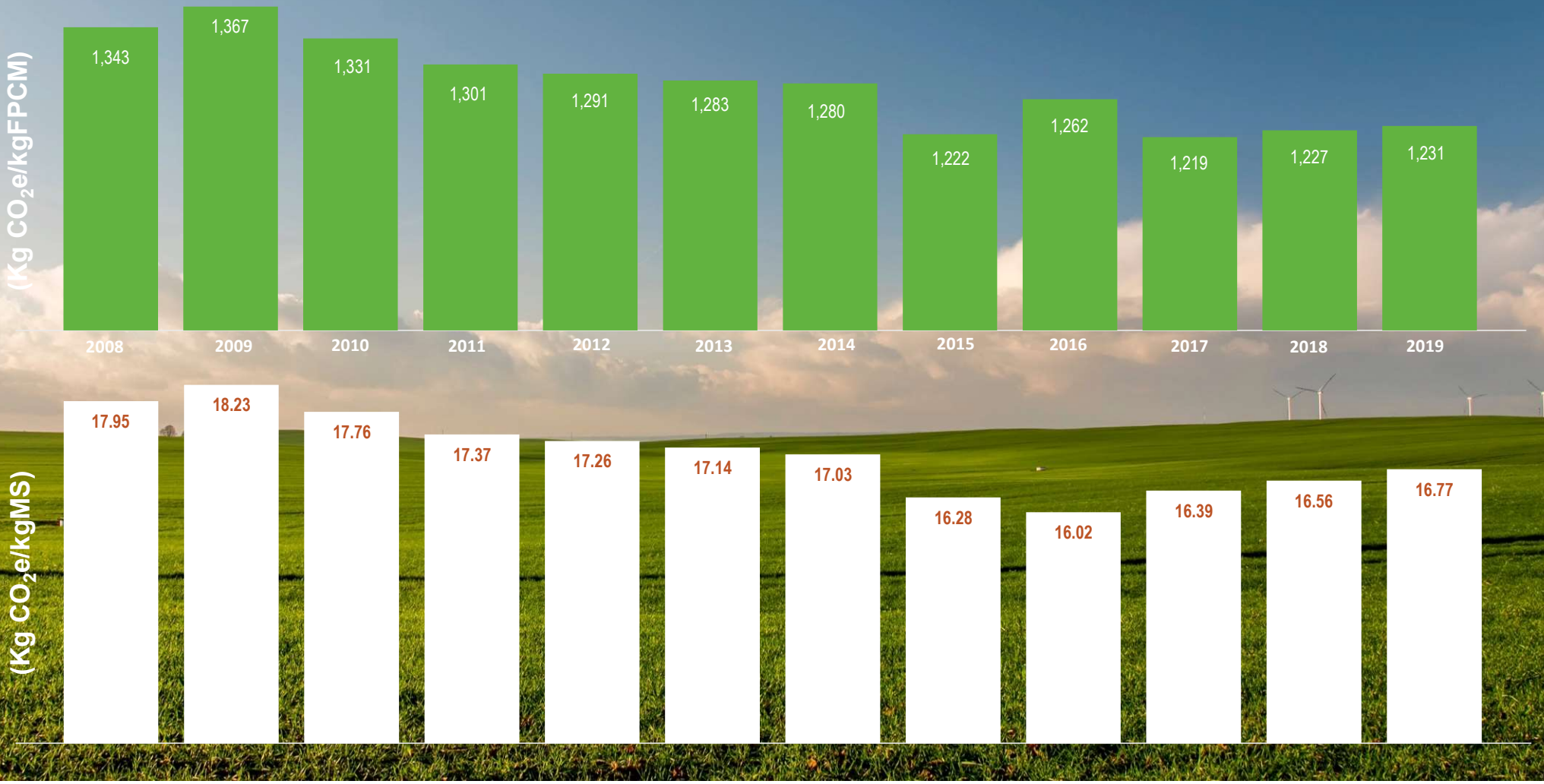
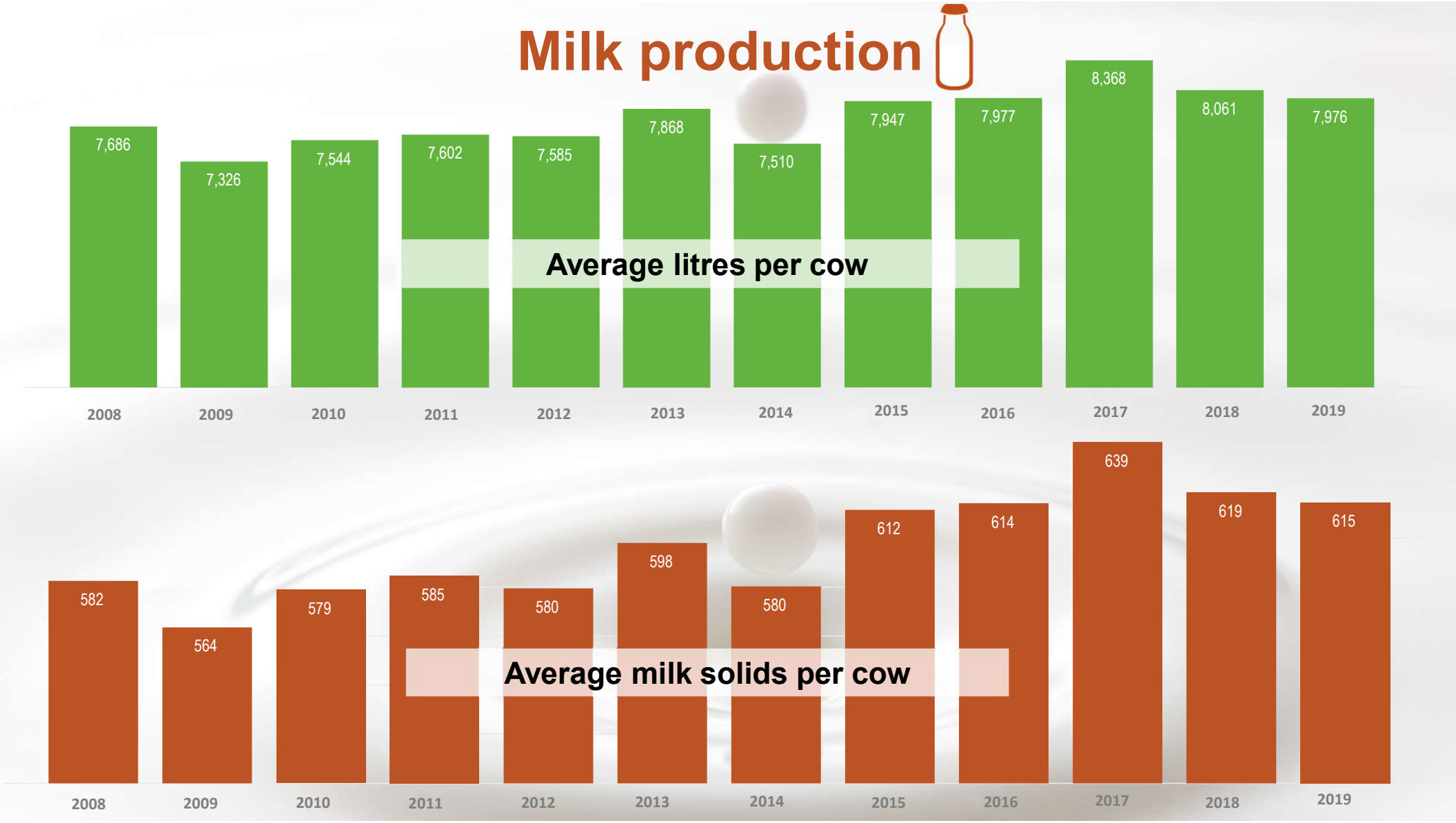
10,000+ FARM ASSESSMENTS

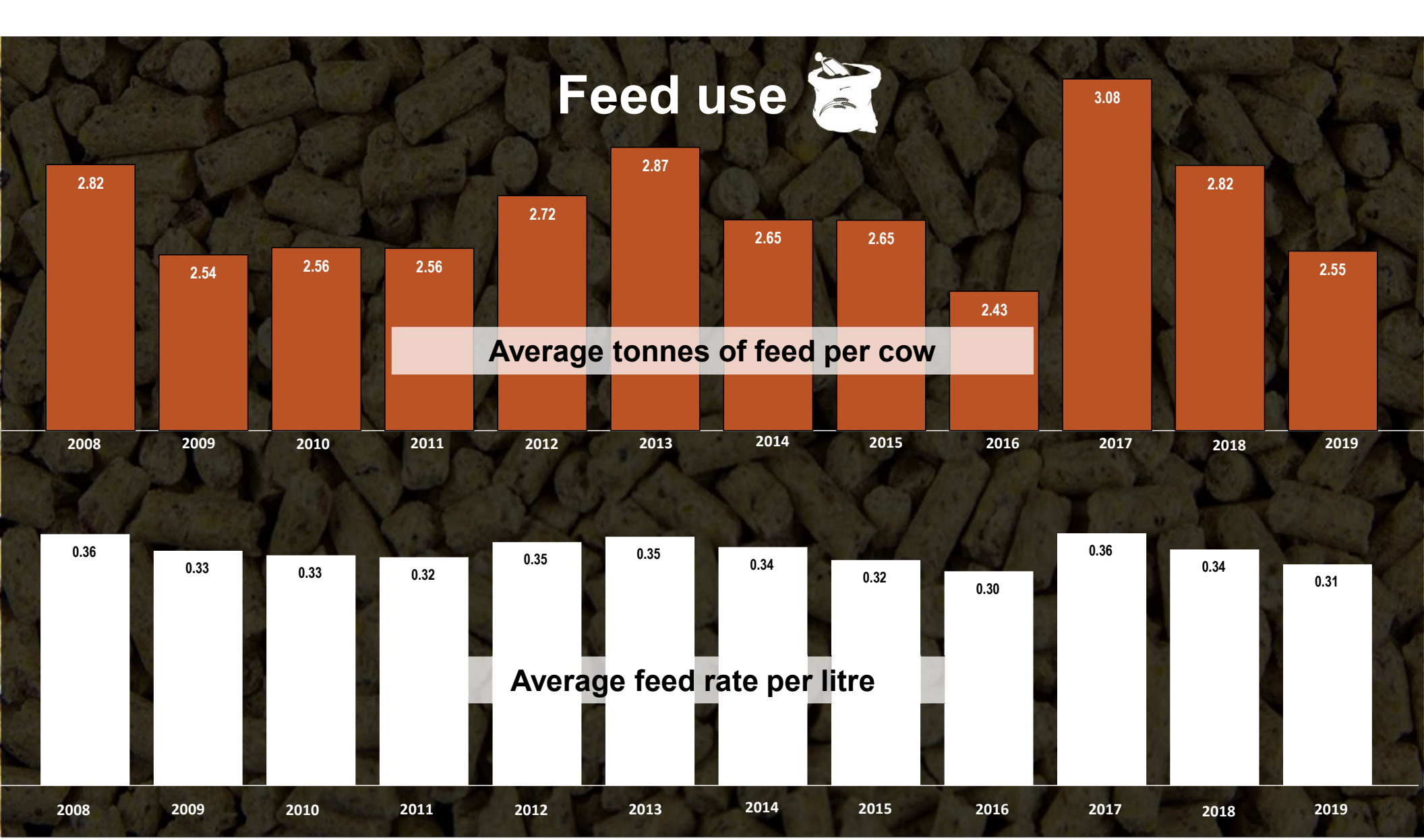
Average carbon footprint 2008 - 2019



Milk production



Feed use


2.82
2.54
2.56
2.56
2.72
2.87
2.65
2.65
2.43
3.08
2.82
2.55
Average tonnes of feed per cow
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

0.36
0.33
0.33
0.32
0.35
0.35
0.34
0.32
0.30
0.36
0.34
0.31
Average feed rate per litre
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

Methodology and Accreditation

- PAS:2050 methodology
- Accredited by the Carbon Trust

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Life Cycle Assessment (LCA)

“Accounts for the environmental impacts of all inputs, processes and outputs within a specified boundary, from extraction of raw materials up to products leaving the farm gate”

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GHG Emissions on farm

Fossil fuel use and energy consumption

By-product of enteric fermentation

Manure and waste management

Multiple pathways: direct, indirect, volatilising, leaching

Urine and manures, applied fertiliser, crop residues

Embedded emissions from pre-farm processes

- Purchased feeds, bedding, fertilisers, transport
- Machinery, replacement animals

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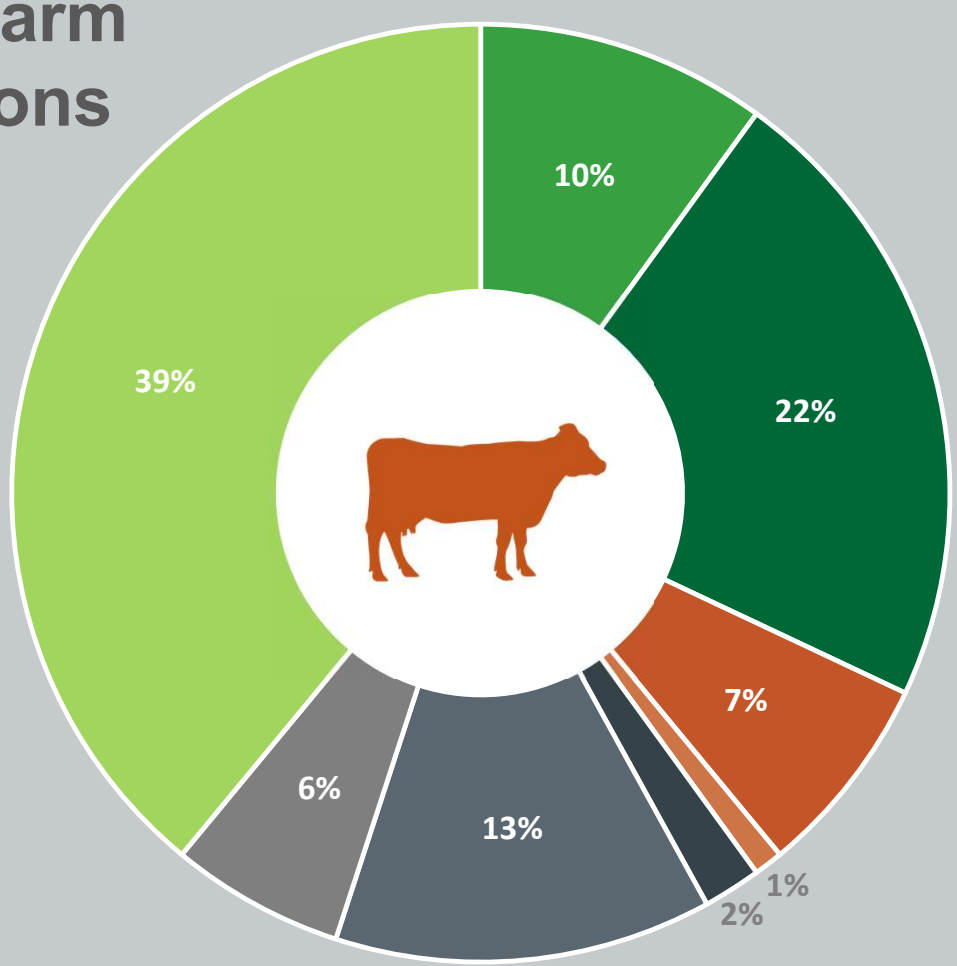
Dairy Farm Emissions



- Enteric emissions (methane from the rumen)
- Feed use
- Nitrous oxide from manure and grazing
- Artificial fertiliser
- Electricity
- Others (incl. bedding, lime and sprays)
- Fuel
- Manure emissions (methane)

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Farm Data

ASSESSMENT

COMPREHENSIVE
FARM REVIEW

DATA ENTRY

CARBON TRUST
CERTIFIED MODEL

Measure and Monitor

EA environmental assessment

Recommendations
Inputs and management advice

Implementation

Re-assessment

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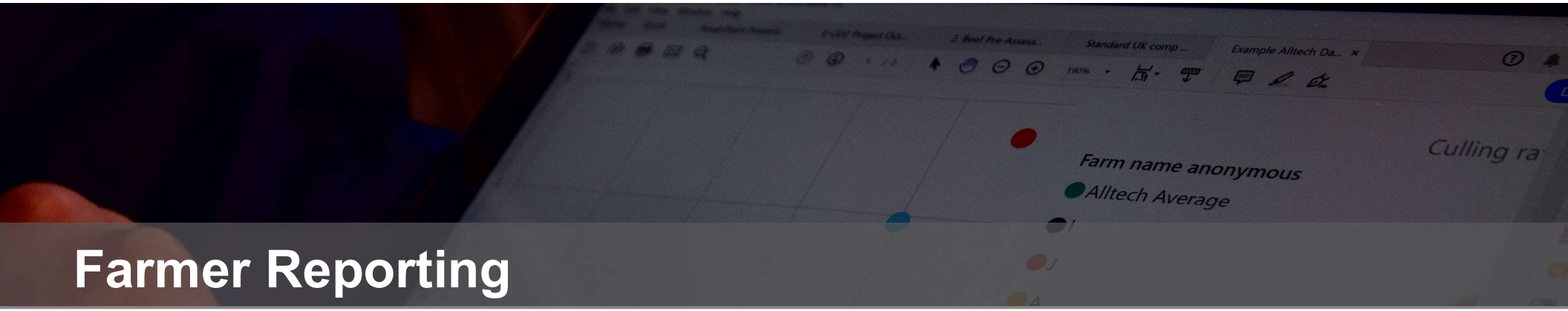
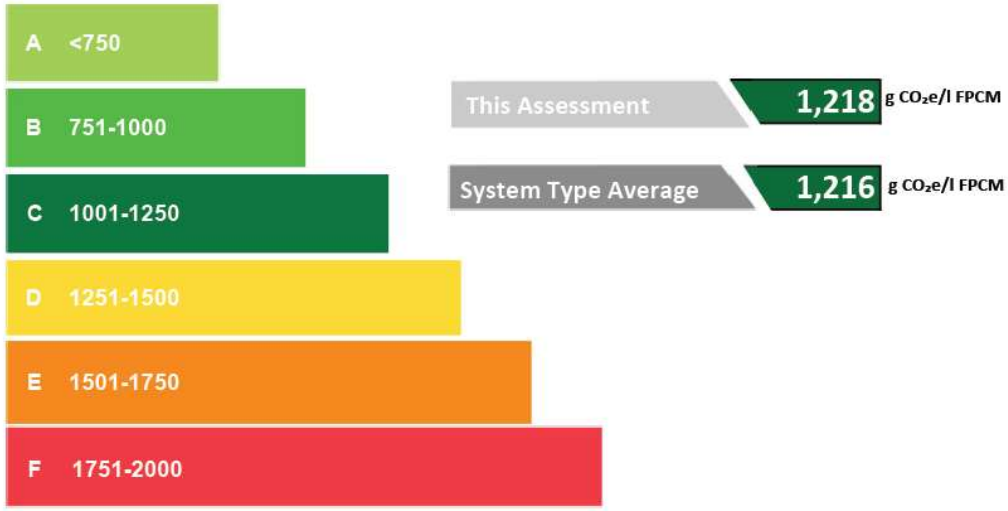


Farmer Reporting

Your carbon performance

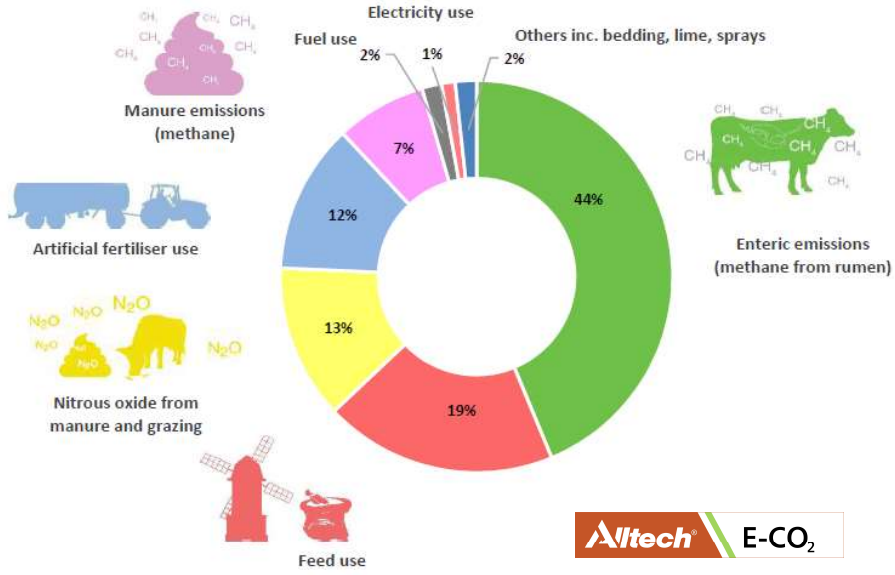


What does "g CO_2e/l FPCM" mean?

Grams of carbon dioxide equivalent per litre of fat and protein corrected milk produced. The sum of all emissions generated on farm in 365 days, divided by the total volume of fat and protein corrected milk produced.

Your farm emissions by source

This pie chart demonstrates the percentage contribution towards total farm emissions from the dairy enterprise, by their source.



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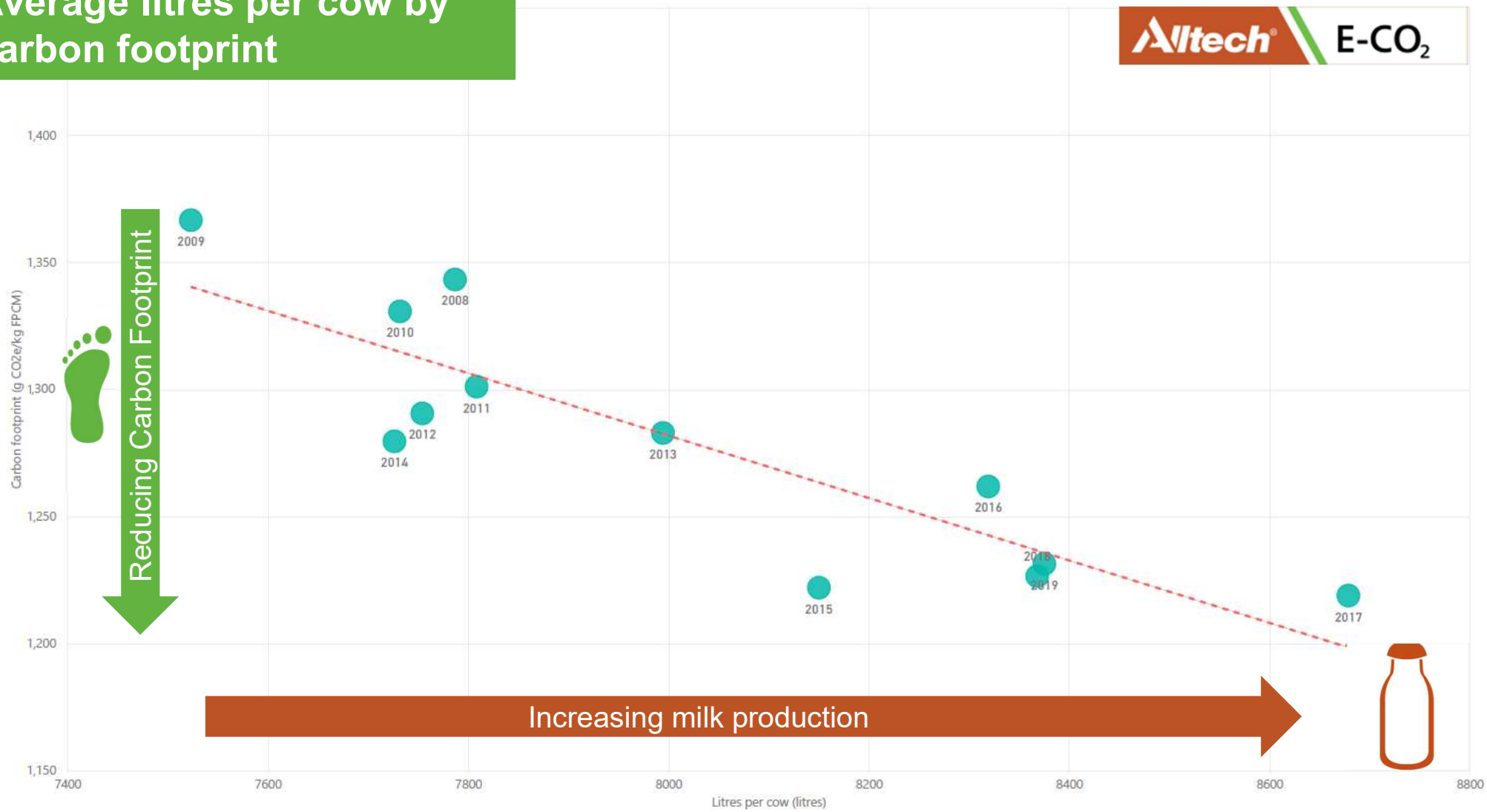
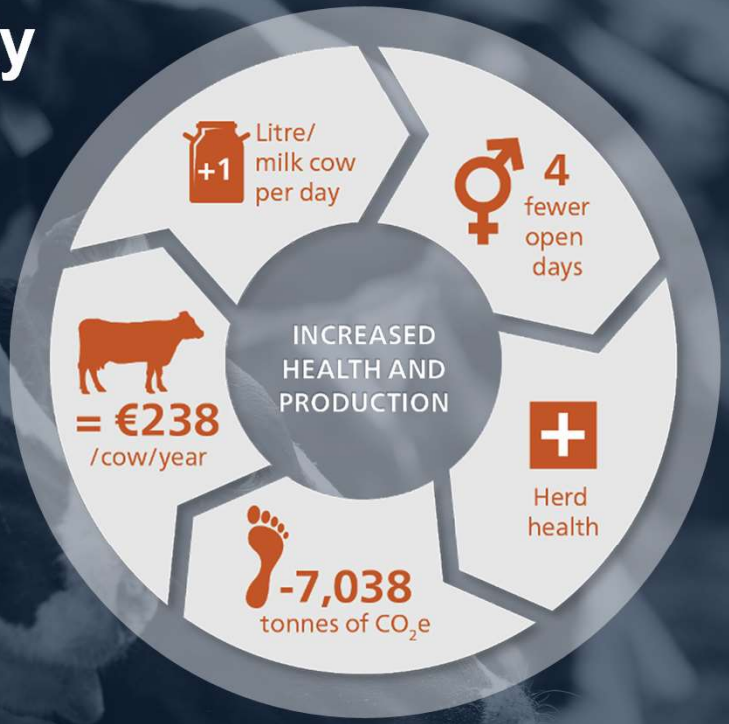
Average litres per cow by carbon footprint



Profitability



=

2,077
Fewer cars on the road

546
Fewer round the world flights

THE STUDY: **DAIRY**

14,257 cows on programme

19 countries

58 farms

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REDUCING EMISSIONS

INCREASING PRODUCTIVITY

INCREASING PROFITABILITY

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FARMERS
Understand and manage environmental impact
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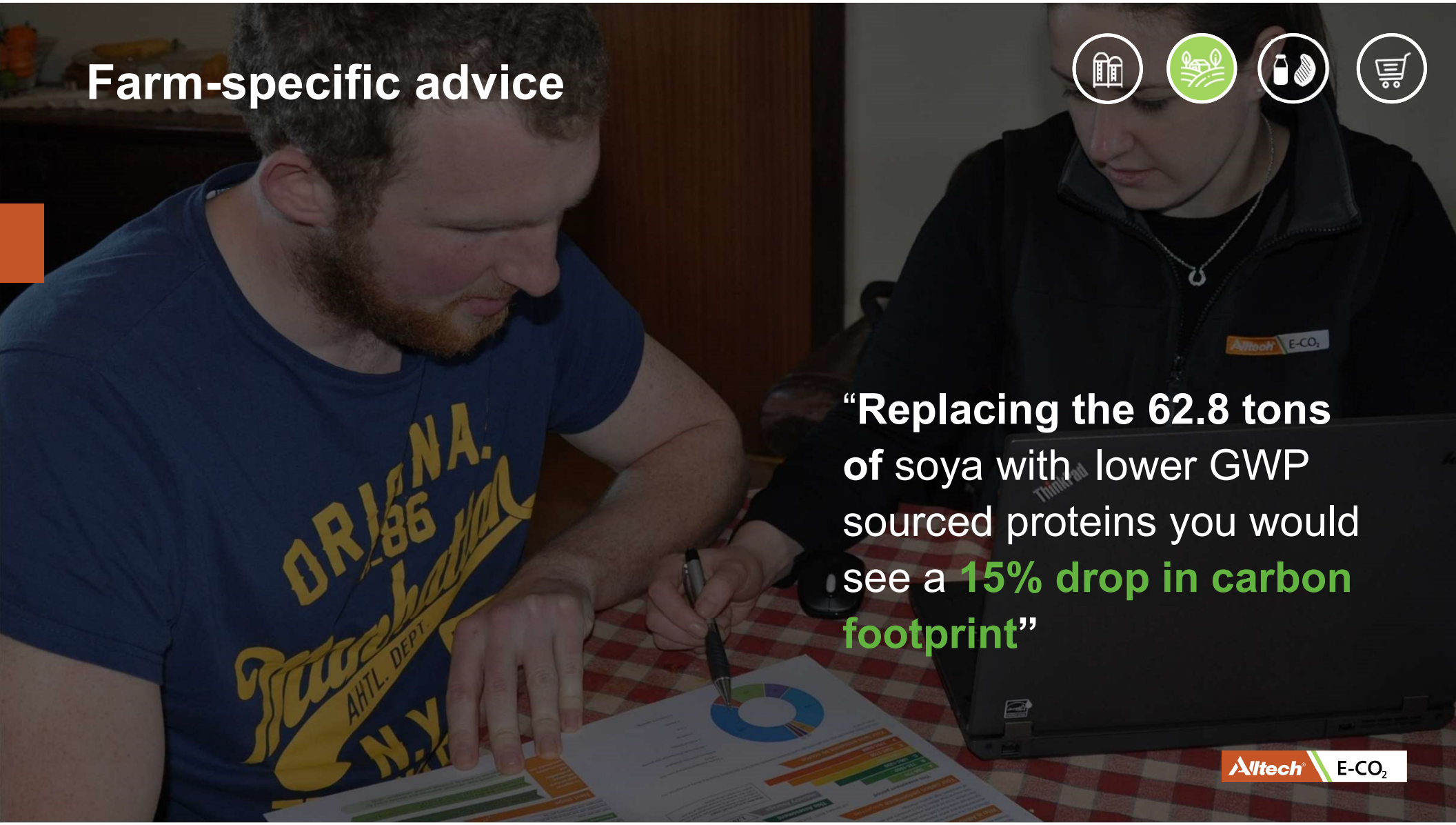
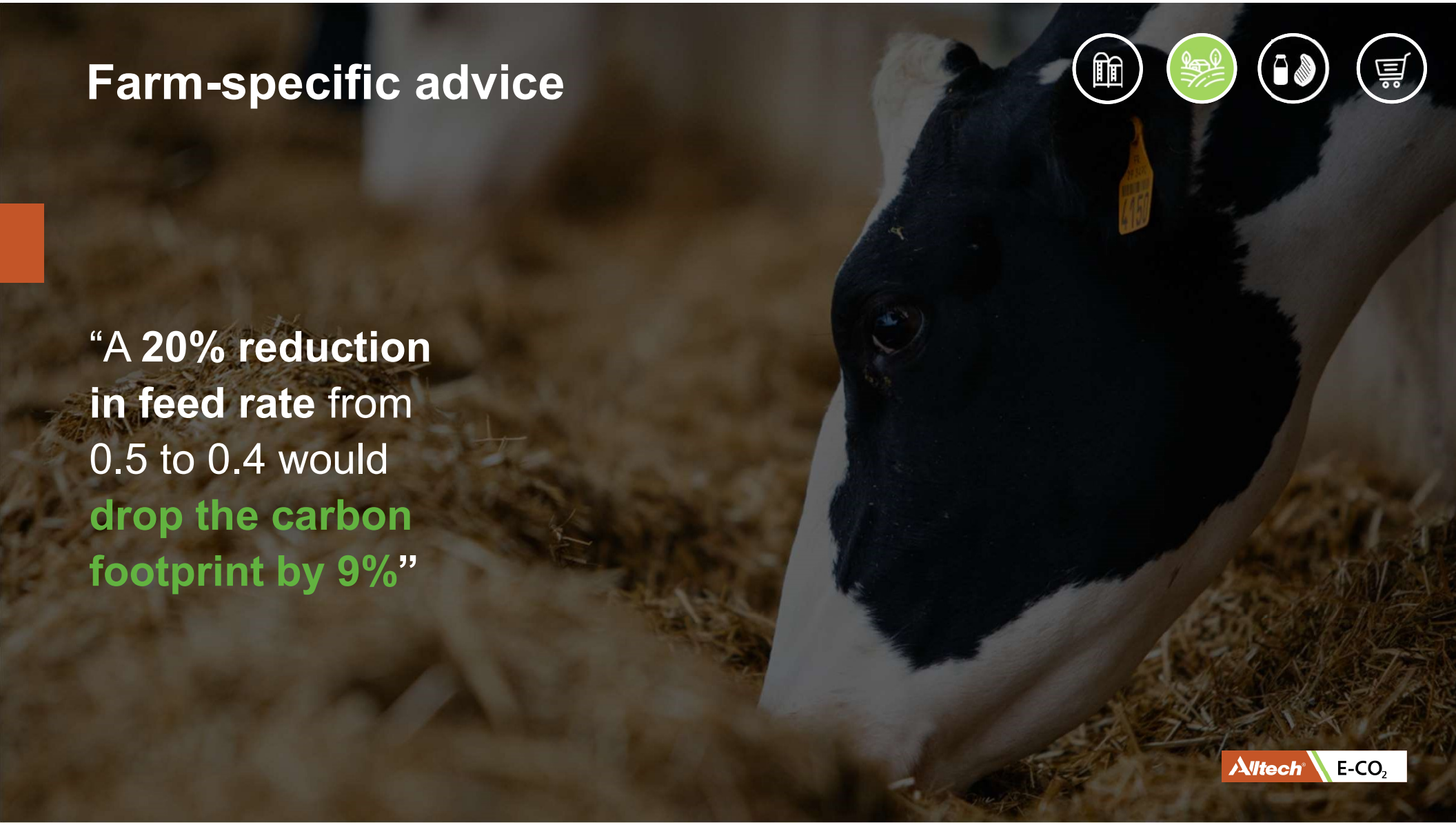
Farm-specific advice



"**Replacing the 62.8 tons of** soya with lower GWP sourced proteins you would see a **15% drop in carbon footprint**"

Farm-specific advice



"A **20% reduction in feed rate** from 0.5 to 0.4 would **drop the carbon footprint by 9%**"

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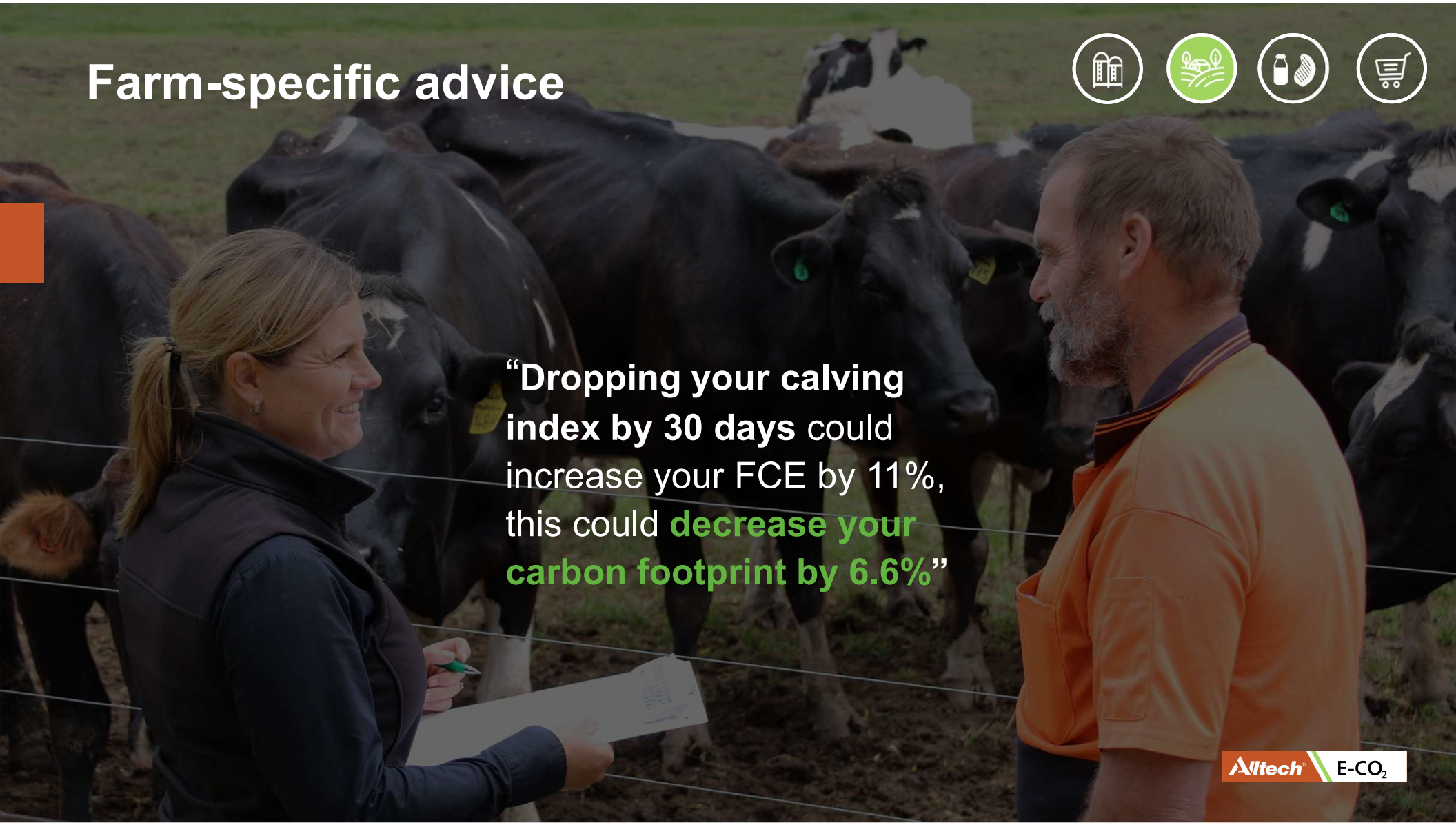
Farm-specific advice



"**Dropping your calving index by 30 days** could increase your FCE by 11%, this could **decrease your carbon footprint by 6.6%**"

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Biodiversity

- Effective biodiversity survey
- Can be integrated into other assessments or standalone
- Offer opportunities for farmers to increase their on farm biodiversity
- Provide important reporting metrics for processors and retailers

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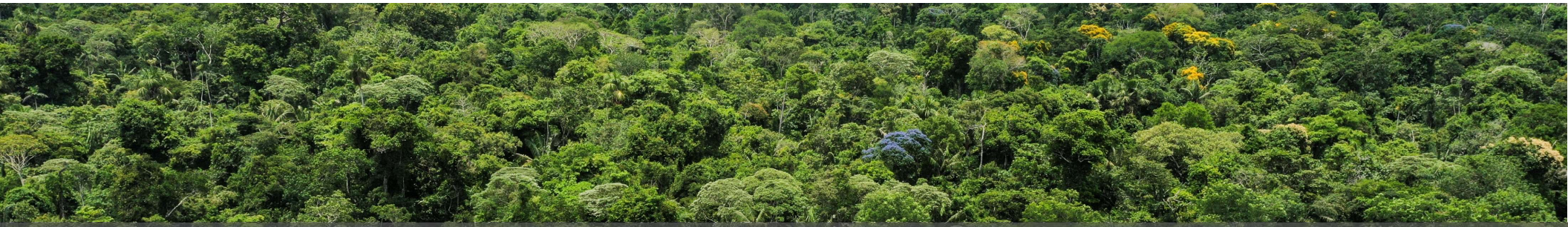
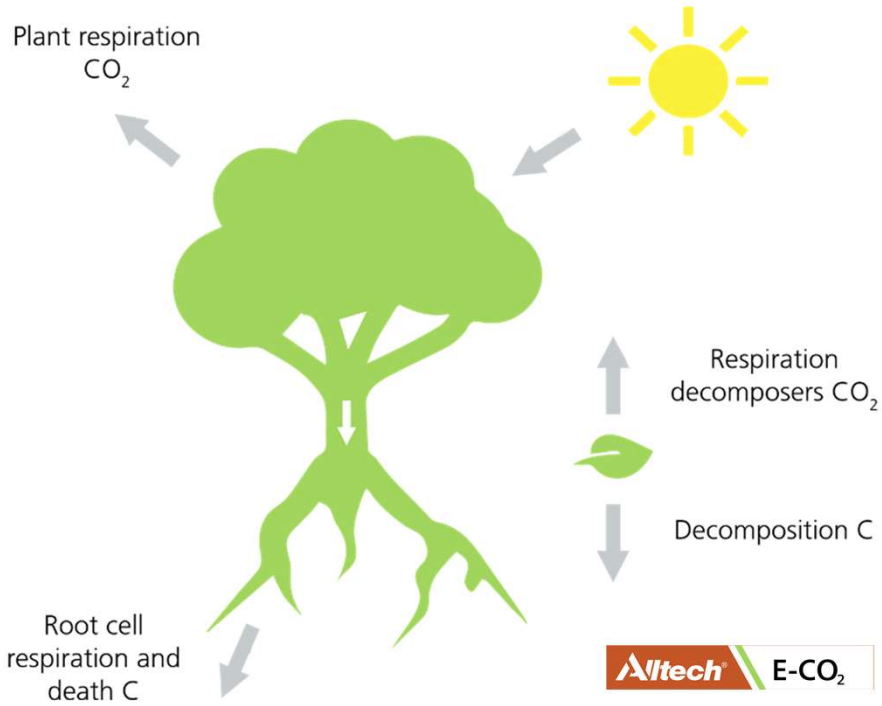


Sequestration

Carbon sequestration is a process by which carbon dioxide is removed from the atmosphere and held in solid or liquid form. We have developed our model to focus on the natural processes of sequestration by:

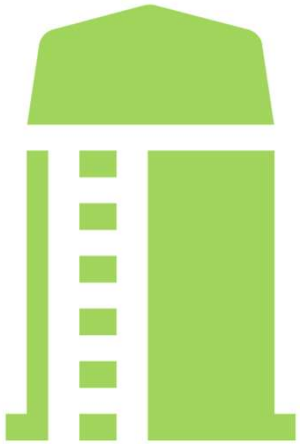
- Grassland
- Woodland
- Wetlands

Carbon itself is stored, it can be stored in living vegetation (trees, grass etc), or it is stored in the soil as soil organic carbon (SOC). SOC makes up around 80% of the terrestrial store of carbon.



Feed Additives

- Range of Carbon Trust endorsed solutions
- Focus on development of product LCAs
- Custom scenarios to measure the benefit of Alltech solutions on farm



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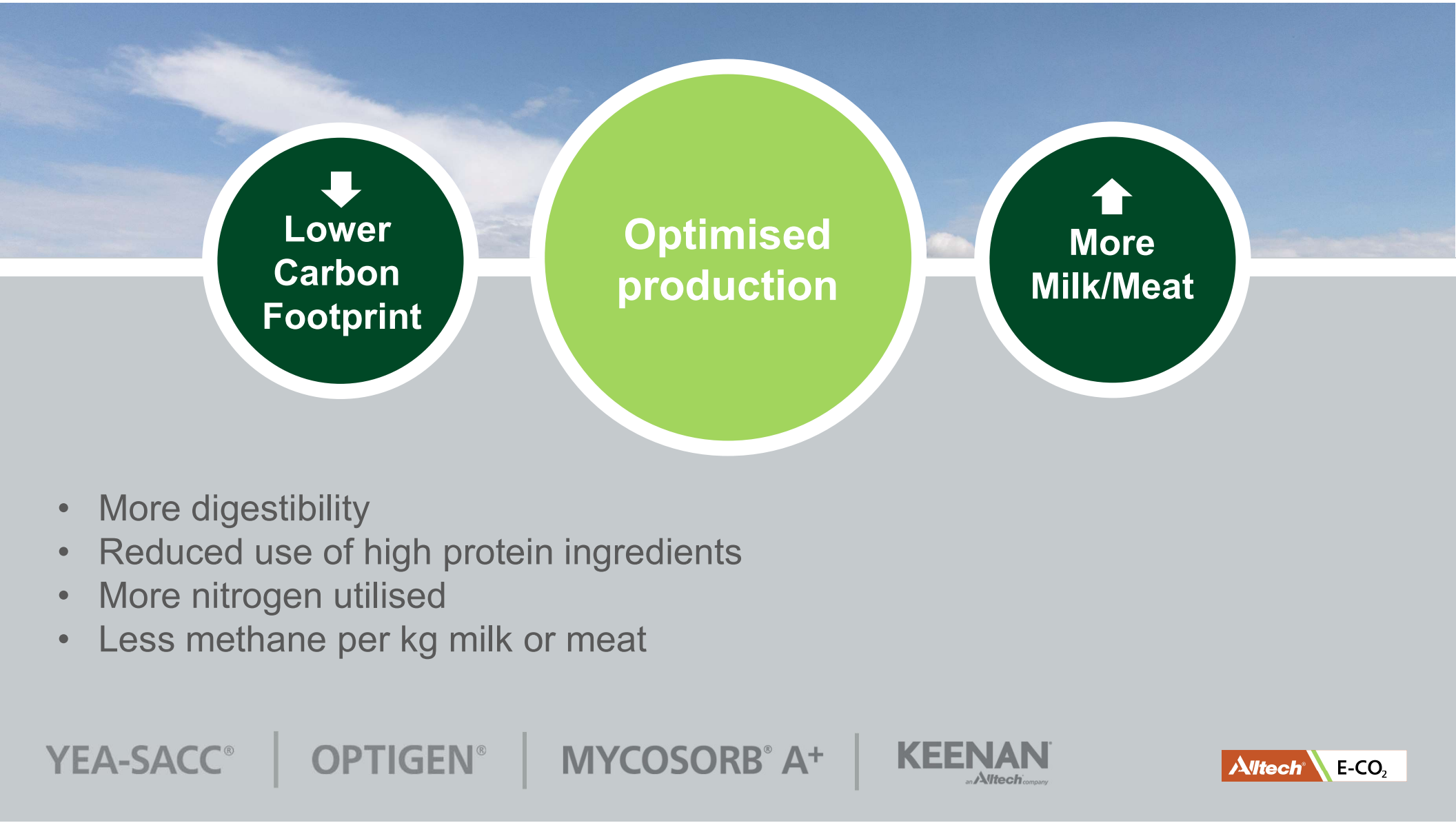

- More digestibility
- Reduced use of high protein ingredients
- More nitrogen utilised
- Less methane per kg milk or meat

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Feed Mills

Change to **sustainable** ingredients

Influence up to **80%** of a farm's emissions

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Sustainable Feed Formulation

MEASURING FEED EMISSIONS

OPTIMISING RATIONS

REDUCING ENVIRONMENTAL IMPACT

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This total emissions reduction between Year One and Year Three of the Co-op Enviro-Map project for all species equates to 124,591 tonnes of CO_2e.

This is the equivalent of:

15721
fewer flights round the world

56399
cars off the road for a year

75464
houses worth of electricity use

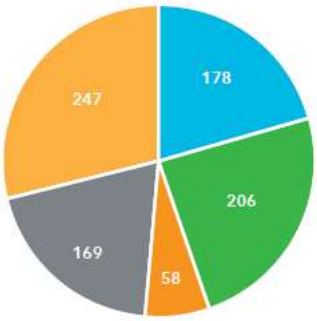
44656
tonnes of recycled waste instead of landfill

CARBON FOOTPRINT

Dairy	Beef	Lamb	Pork	Broiler	Laying Hens	Turkey
1,175 g CO_2e/litre	10.44 kg CO_2e/kg LW	10.49 kg CO_2e/kg LW	3.72 kg CO_2e/kg LW	2.24 kg CO_2e/kg LW	1.76 kg CO_2e/dozen eggs	3.55 kg CO_2e/kg LW

852 hectares

of woodland is grown across our farming groups encouraging a variety of flora and fauna on their land.



Our producers manage **192 hectares** of watercourses and wetland. This provides habitats for species such as Crested newts, Skylarks, and Lapwings, all of which are monitored on the farms.

Our farmers also continue to encourage wildlife on farm with over **141 installing devices** and providing habitats including bird boxes and feeders, butterfly meadows, beetle boxes, wild bird plots, bat boxes and fish habitats.

Amazingly, our producers maintain **598 hectares** of wildflower meadows on the supplying farms; this is equivalent to **717 full size football pitches!**

They also manage **1,458 km** of hedgerows across all of the groups. **This is equivalent to the distance between the Co-op's Manchester HQ and Madrid.**

McDONALD'S BEEF CARBON REPORT

MEASURING AND MONITORING CARBON EMISSIONS FROM BEEF PRODUCTION

THE AVERAGE CARBON FOOTPRINT FOR BEEF FARMS IN THE CORE GROUP STARTED AT 13.76KG CO_2 EQUIVALENT (CO_2E) PER KG LIVEWEIGHT

BETWEEN 2008 AND 2014, THIS REDUCED BY 3.17 KG TO 10.59 KG CO_2E/KG LW A 23% IMPROVEMENT IN CARBON FOOTPRINT

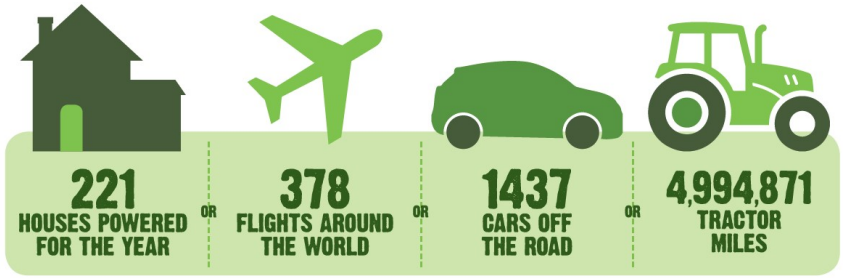
INDUSTRY RESEARCH PUBLISHED BY AHDB BEEF AND LAMB IN 2012[1], INDICATED THAT BETWEEN 1970 AND 2010 THE BEEF SECTOR REDUCED ITS FOOTPRINT BY 9.4% EVERY DECADE

ANNUALISED, THE LONG TERM INDUSTRY REDUCTION HAS BEEN 0.94% BUT THE FARMERS IN THIS STUDY HAVE SEEN A FALL OF 4.6% PER YEAR

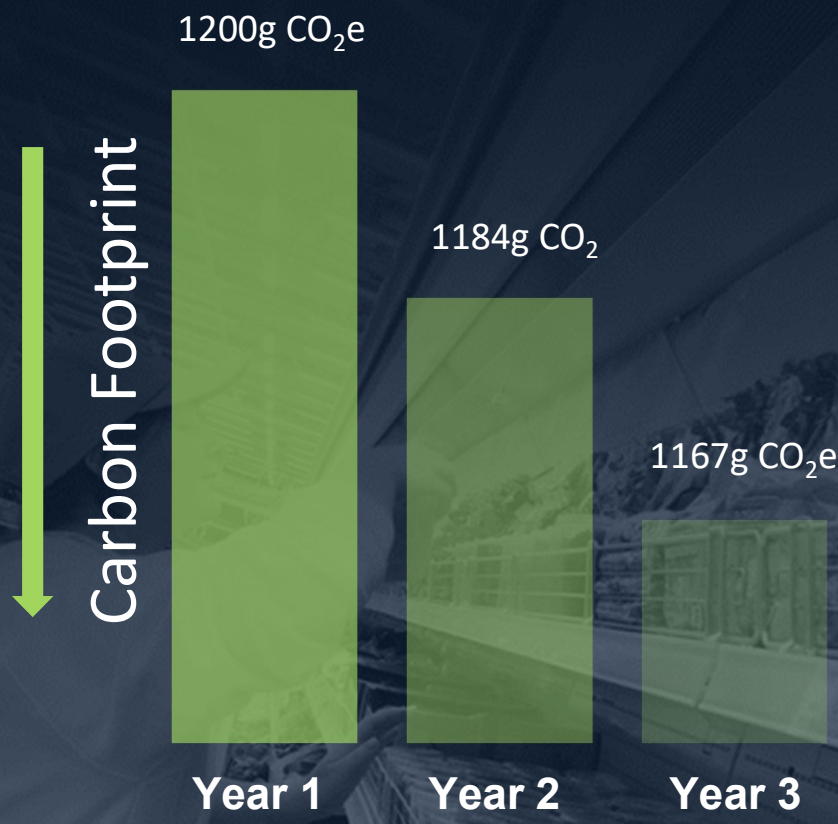
A PREVIOUS STUDY BETWEEN ALLTECH E-CO_2 AND AHDB[8] FOR A GROUP OF FARMS NOT LINKED TO THIS STUDY, SHOWED THAT FOR EVERY 5KG REDUCTION IN CARBON, A 50P PER KG IMPROVEMENT IN FINANCIAL MARGIN WAS REALISED

IF THIS WAS APPLIED TO THE GROUP OF FARMS ANALYSED IN THIS STUDY, IT COULD EQUATE TO A FINANCIAL BENEFIT OF 32P/KG LIVEWEIGHT. A SIGNIFICANT POTENTIAL COST SAVING THROUGH A FOCUS ON REDUCING CARBON

HOW MUCH CARBON HAS BEEN SAVED OVER THIS STUDY?[9]



Results



- Carbon reduction
- Improved feed conversion
- Animal health improvements
- Resource efficiency

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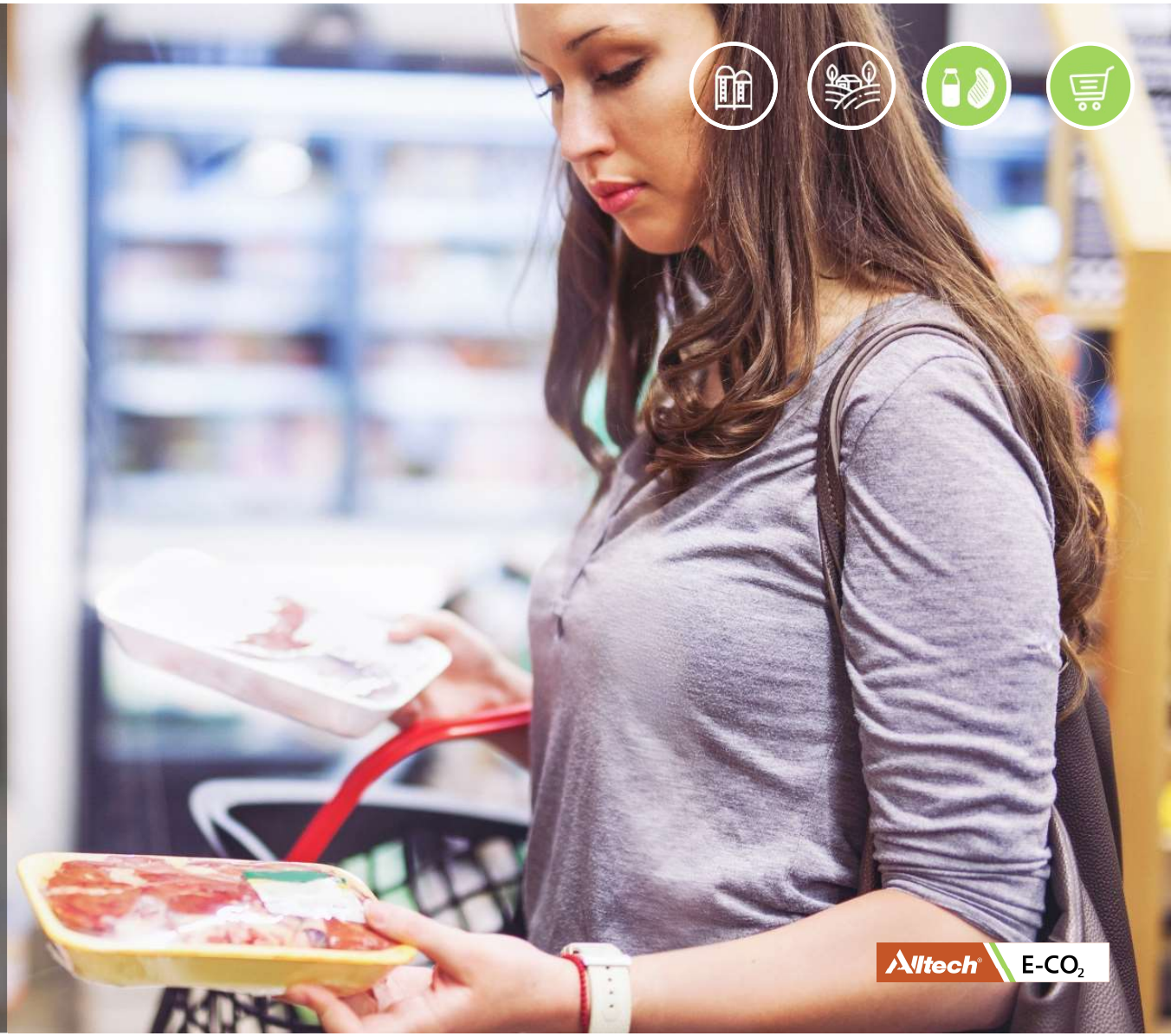
Processors and Retailers

43%

of consumers

think it is important for businesses to reduce the carbon footprints of their products

Source: Carbon Trust, Product Carbon Labelling Report 2020



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Sustainable Food Chain


Planet of Plenty™
Euroopa Liit maaelu arenguks
Euroopa Maaelu Arengu Põllumajandusfond: Euroopa investeeringud maapiirkondadesse