FEEDING THE FUTURE:

| Using data derived technologies and insights to make better feeding decisions

Conan Condon

Head of Agri Analytics, Alltech

Alltech®

Euroopa Maaelu Arengu Põllumajandusfond: Euroopa investeeringud maapiirkondadesse


We believe
agriculture
has the greatest potential
to positively shape the
future of our planet


Working
Together
for a
Planet
of Plenty™
Alltech®

The Green Economy: A Growth Opportunity

an opportunity for businesses to
DIFFERENTIATE & **CAPTURE GROWTH**

Alltech®

European Green Deal Aspirations

EU Methane Strategy

Organic Farming
- 25% organic by 2030

Excess of nutrients (Nitrates & Phosphates)
- Nutrient loss: 50% reduction
- fertilizer use: 20% reduction

Locally grown produce
- Sustainable alternative proteins

Antimicrobial resistance
- antimicrobial use: 50% Reduction

Food waste reduction
- 50% reduction

Alltech®

Green penalties

AVOIDANCE OF PUNITIVE MEASURES

Increasing state legislation with penalties and fines. Aimed at improving efficiency and reducing waste.

Alltech®

Green opportunities

BRANDED, UNIQUE PRODUCTS

Value creation by creating foods that satisfy consumer demands for healthy, tasty, green alternatives

Alltech®

IMPEGNO PER L'AMBIENTE

#ScelteBuone
NUTRIAMO INSIEME L'OGGI E IL DOMANI

Delivering on consumers' demand for **ANIMAL WELFARE**

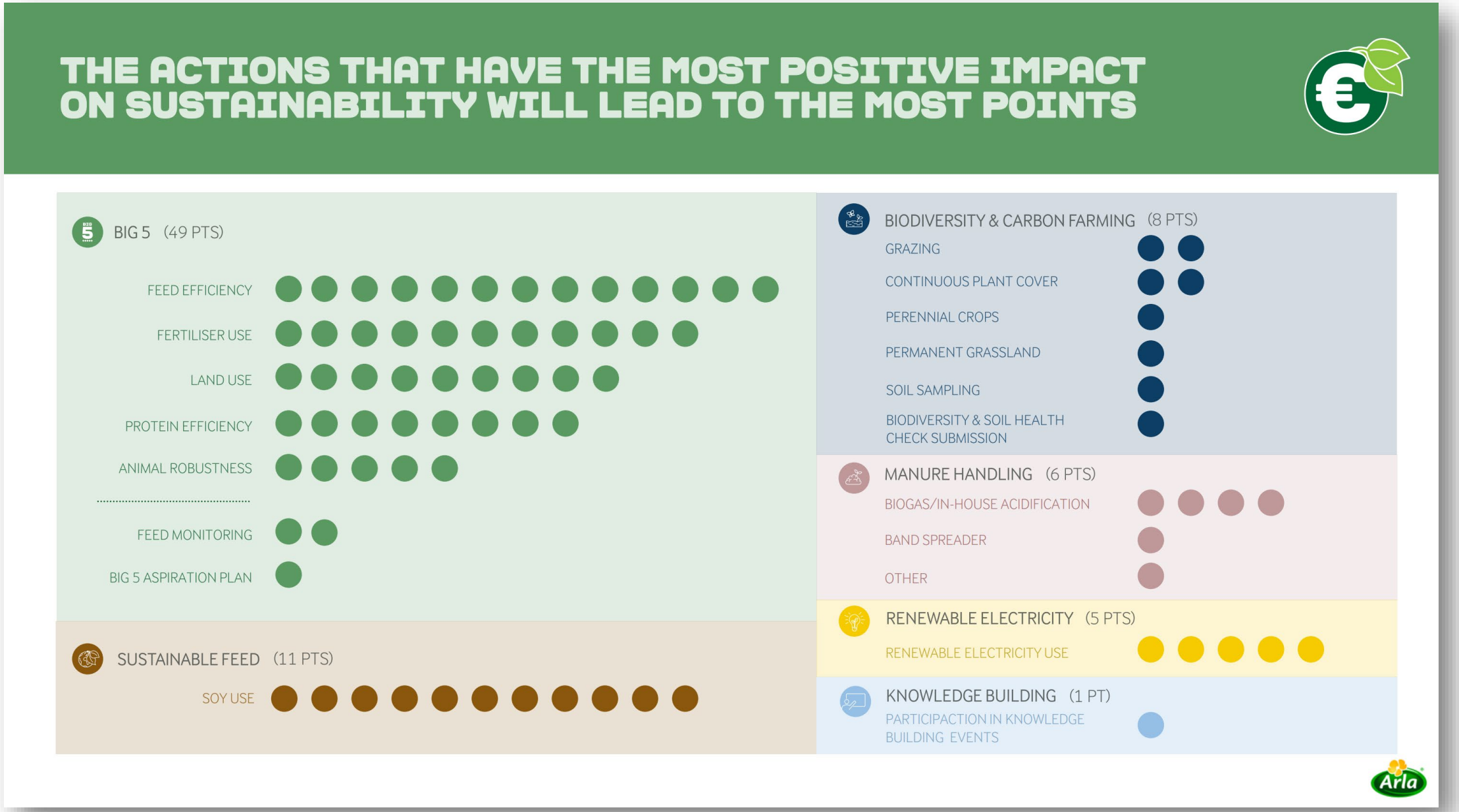
Il benessere degli animali

L'attenzione al **benessere animale** ed **all'uso prudente degli antimicrobici** in medicina veterinaria sta assumendo un'importanza sempre più rilevante. Per Parmalat la garanzia del benessere animale è un fattore fondamentale, di fatto ha iniziato già da alcuni anni dei percorsi di miglioramento con le stalle delle sue filiere che vadano oltre il livello garantito dalle normative vigenti.
Parmalat attraverso un team di tecnici specializzati organizza **corsi di formazione** specifici in tema di benessere animale agli allevatori delle sue filiere, assistendo poi anche a livello di stalla le nozioni teoriche illustrate.
Un principio primario è che animali sani e ben accuditi possono vivere più a lungo ed hanno meno malattie, necessitano di meno trattamenti farmacologici, e producono più latte di qualità.
Le stalle delle filiera BIO di Parmalat hanno abbracciato per vocazione questi aspetti garantendo agli animali allevati quindi buona salute, buona alimentazione, buona stabulazione con spazi aperti e pascoli dove gli animali possano esprimere un comportamento appropriato e altre pratiche zootecniche che rafforzano il sistema immunitario e stimolino le difese naturali contro le malattie.

Rewarding farmers €0.04/L for exceeding a welfare score of 70

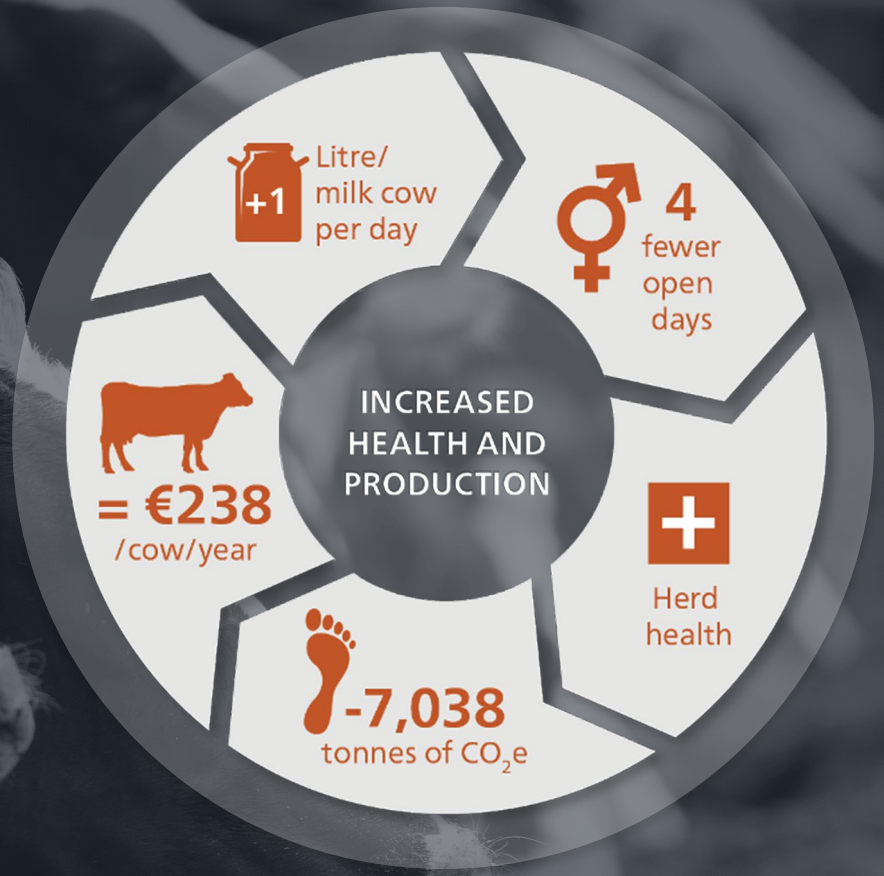
Rewarding farmers €0.024/L for achieving sustainability targets

ARLA: Collect points to earn €



Alltech E-CO_2

Capturing value by collecting data to provide an advisory service



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2,077 fewer cars on the road

546 fewer round-the-world flights

THE STUDY: **DAIRY**

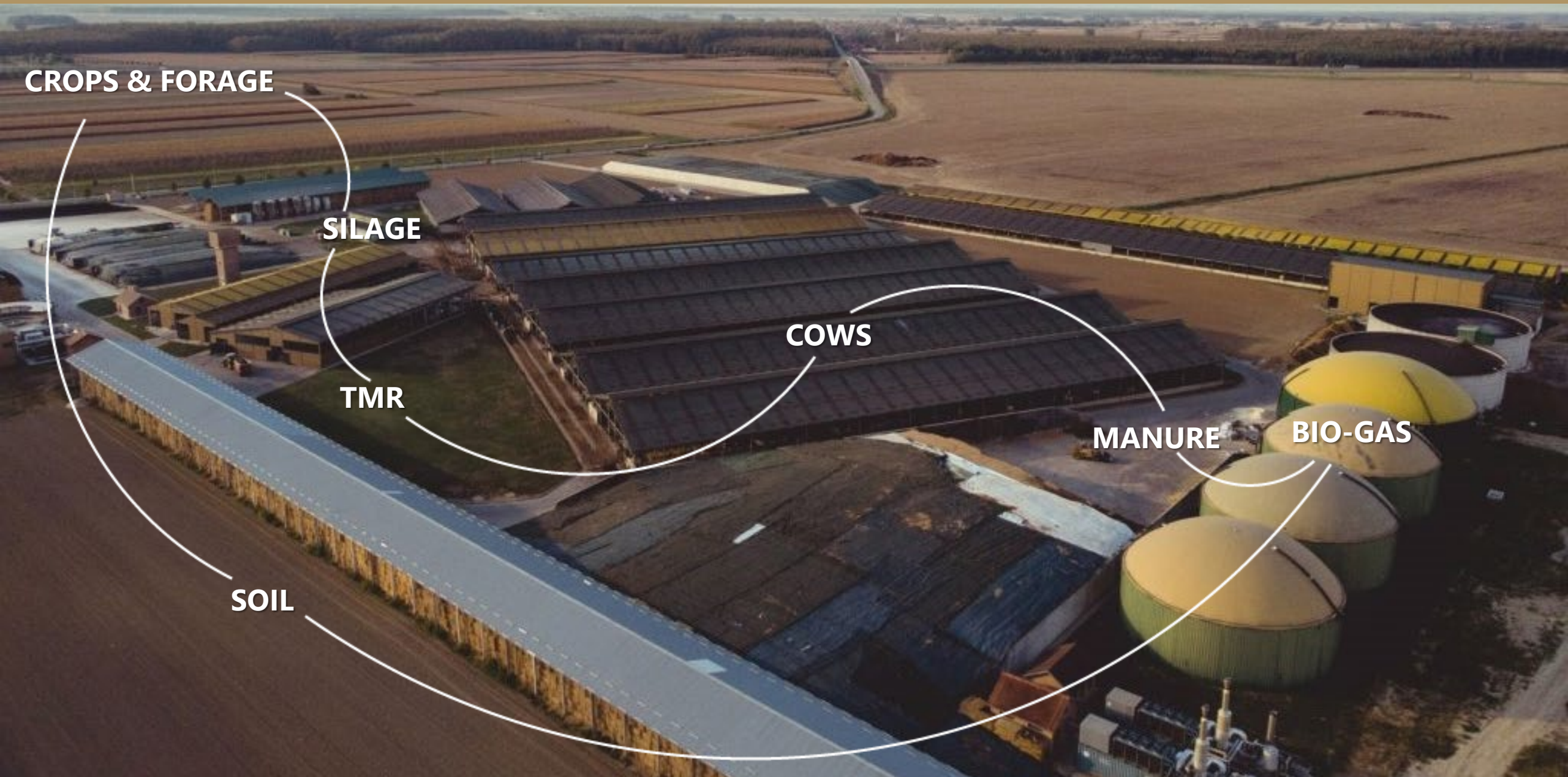
14,257 cows on the programme

19 countries

58 farms

ANDECHSER NATUR

Rewarding farmers €10/ton of captured soil carbon


CROPS & FORAGE
SILAGE
TMR
COWS
MANURE
BIO-GAS
SOIL

Systems Approach

- Policy & Support
- Pharma & Animal Health
- Crop Science
- Animal Nutrition
- Genetics
- Machinery & Housing
- Finance

Food Processors

Retailers

Consumers

SUPPLY CHAIN COMPLEXITY

"PARTNERS in the supply chain can best collaborate, innovate and resolve challenges when connected via DIGITAL systems"

Alltech®

Alltech® INTOUCH

InTouch Technology is a total **feed management system** designed to give producers control of their feeding for all ruminant animals.

InTouch Network

- Feeding > 490,000 animals in 40+ countries worldwide each Day
- 1800+ active users
- Working throughout the supply chain
- Technology powered by Intel, Vodafone, Dinamica Generale and Microsoft

Alltech®

Alltech® INTOUCH

vodafone

Alltech®

ENTERPRISE IRELAND

2008
PACE is launched, patented technology that is programmed to decide the best way to mix a combination of different feeds.

2011
Partnership with **Vodafone** internet of things (IoT), cloud connectivity enables easy transfer of data to anywhere in the world.

2013
First introduction of **InTouch**, new levels of analytics and insights transform how the InTouch feeding specialiata work with farmers.

2016
InTouch becomes a member of the **Alltech** family. InTouch live hosted at Alltech ONE conference in Kentucky.

2018
Launch of 3rd Gen controller with 8” colour screen. Winner of the technological innovation at LAMMA tradeshow.

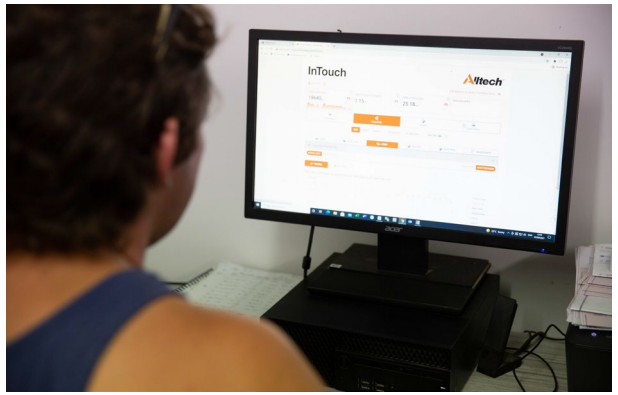
2021
Launch of 4th Gen controller, Feed Management APP and Dashboard. Winner of the Enterprise Ireland Innovation AgriTech award for Established company.

2022
Active in 40+ Countries feeding over 490,000 animals

The pain points for the farmer are inefficient usage of feed, poor management decisions due to ineffective data analysis and minimising the costs of disease outbreaks on farm.

Feed inefficiency

Feed represents **up to 70% of farm input cost**, but usage is not optimal and wastage is a big problem.



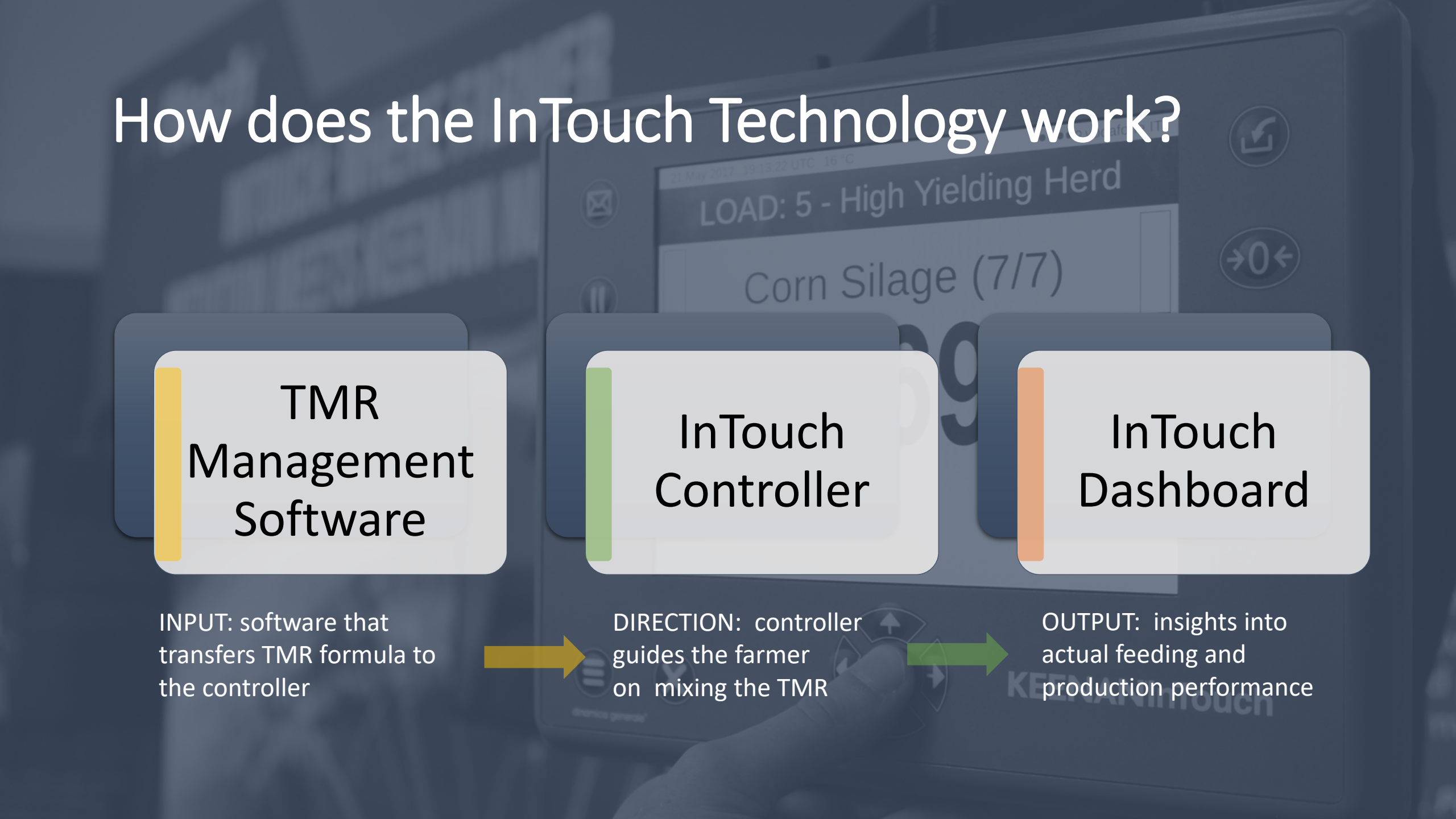
Poor Insights

Farmers generate a lot of data, but are **unable to analyse and generate insights**, which leads to poor management decisions.

Animal Health

Significant losses occur from sick animals including drop in productivity, cost of treatment and increased mortality/culls.

How does the InTouch Technology work?



TMR Management Software

INPUT: software that transfers TMR formula to the controller

InTouch Controller

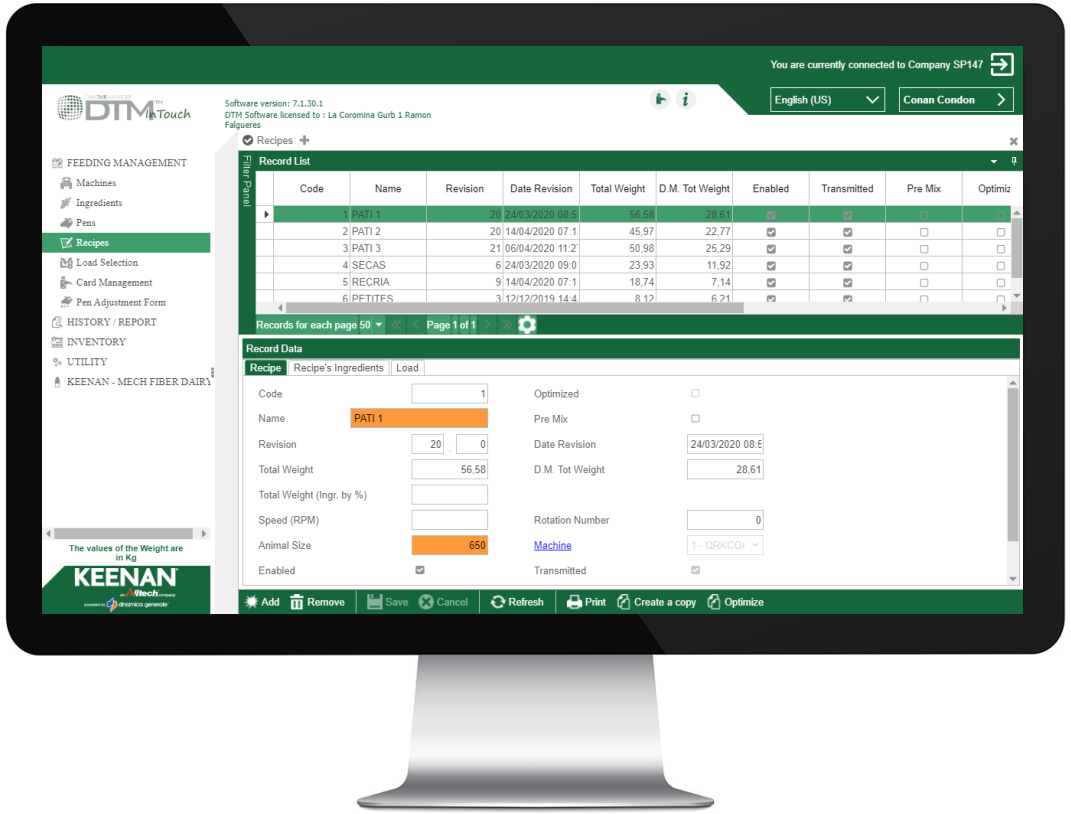
DIRECTION: controller guides the farmer on mixing the TMR

InTouch Dashboard

OUTPUT: insights into actual feeding and production performance

INPUT: software that transfers TMR formula to the controller

Feed Management Software



- **INGREDIENTS -** Accurate control of feed costs, dry matter intake & refusals
- **FEED LIBRARY** - Select Ingredients from the feed library with pre-set chemical parameters.
- **DIETS -** Create and easily edit animal diets (not formulation)
- **AUTO OPTIMIZE** – automatically optimize your ration based on the recommended loading order.
- **PEN ADJUSTMENT FORM (PAF)** – manage animal groups in one place
- **WIRELESS TRANSFER** of animal diets to the KEENAN controller
- **INVENTORY -** Accurate management of feed stock levels
- **CUSTOMIZABLE** – Customize the menus & screens that you require to run your farm
- **MULTIPLE CONTROLLERS** - program multiple KEENAN controllers under one customer account and customise the loads.
- **RATION PERFORMANCE MONITORS (RPM)** – Record manual production, feeding and health data to generate an RPM profile

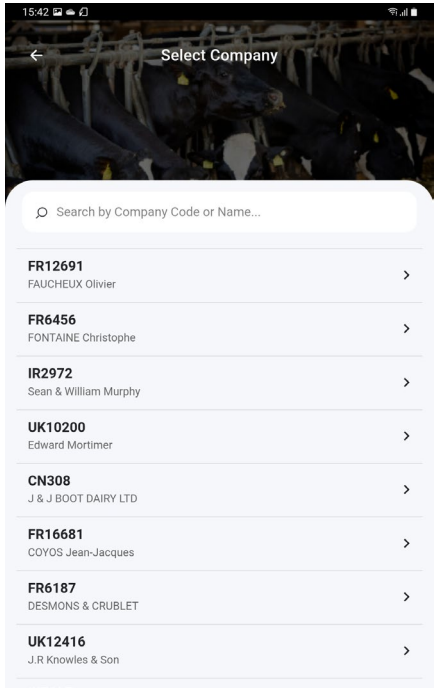
DIRECTION: controller guides the farmer on mixing the TMR

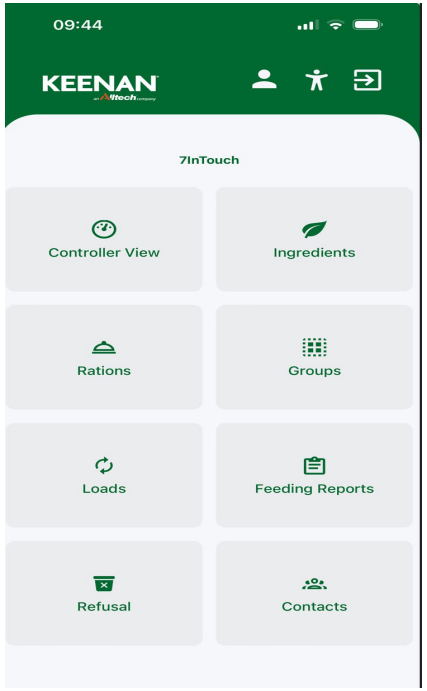
Feed Management Hardware

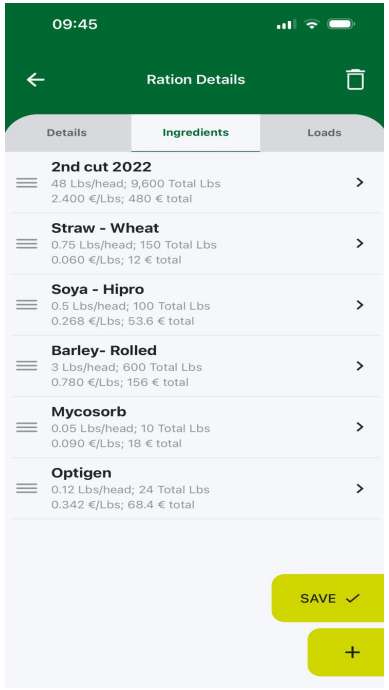
Key Features/Benefits

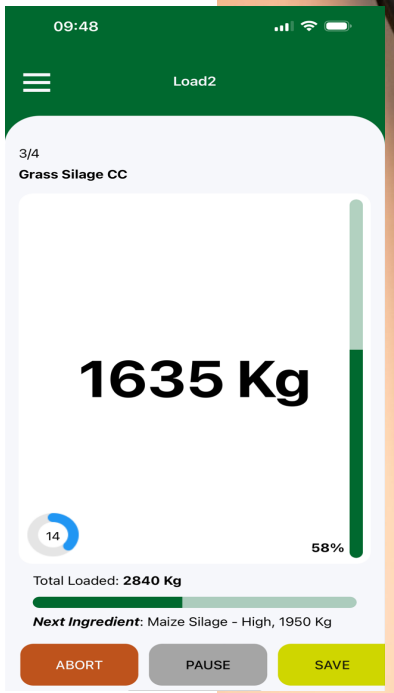
- User friendly, reliable and robust
- Delivers consistent mix quality for optimum herd productivity
- Removes the need for paper – calculates exactly what is needed based on animals and rations
- Maintains feed accuracy
- Automates the transfer of diets

InTouch Feed Management APP





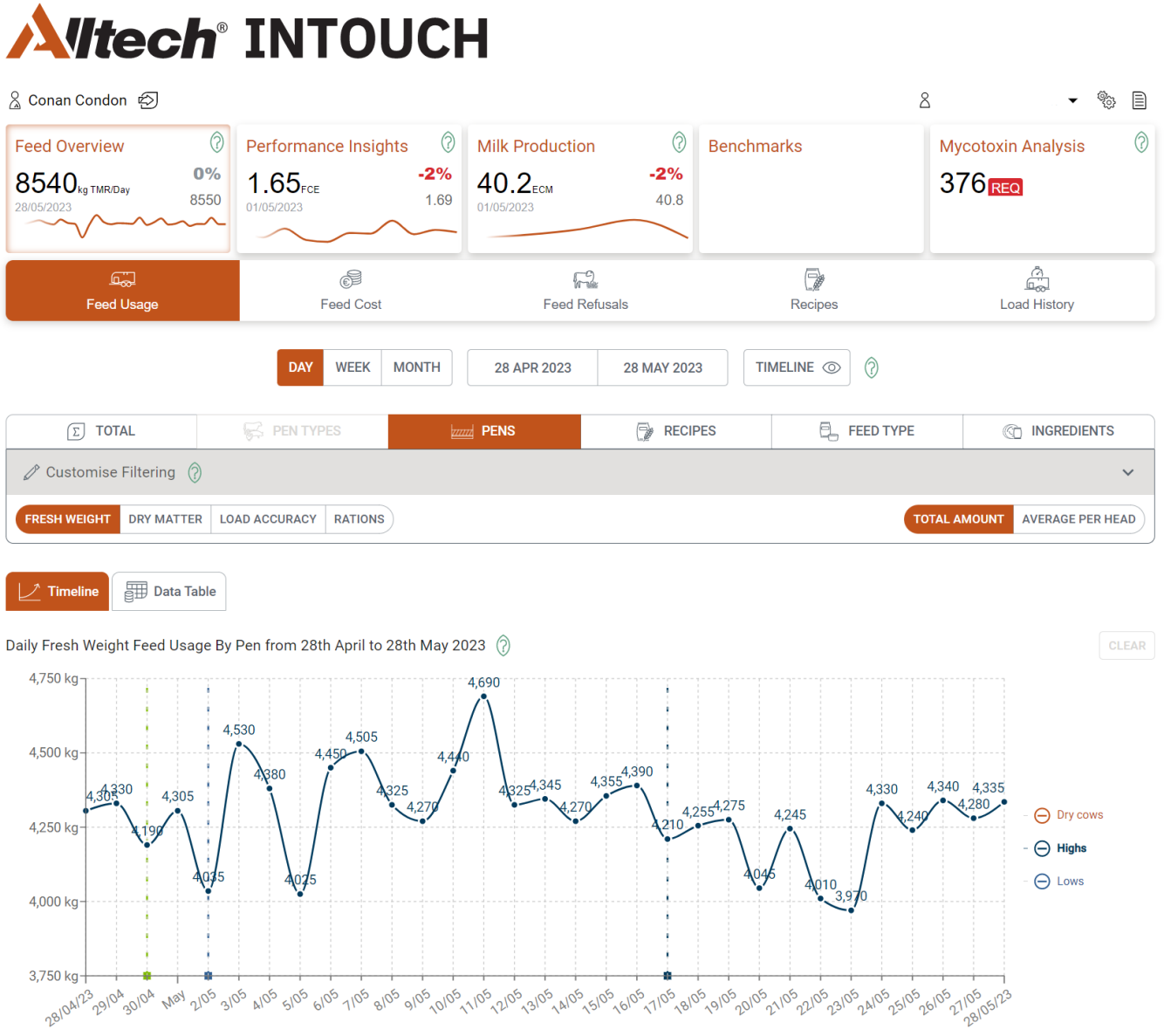




OUTPUT: insights into actual feeding and production performance

InTouch Dashboard

- Real-time feed data & feed cost insights
  - Visual timeline on Fresh Weight and Dry Matter intakes
  - Detailed data on individual pens, recipes, ingredients
  - Loading accuracy
- Daily performance on feeding\production data
- Single Sign-On. One username and passwor for all your customers
- Track Recipe Change events



Feed Efficiency

Category	Feed Efficiency	Milk Yield (lbs)	DMI (lbs)	Fat %	Prot %	Feed Costs ($c/l)	Margin Per Cow $
First Time Users	+0.13	+1.8	-0.8	+0.07	+0.05	-2.0	€244
All Users*	+0.09	+1.5	-0.3	+0.01	+0.04	-1.0	€183

* Purchased multiple InTouch systems

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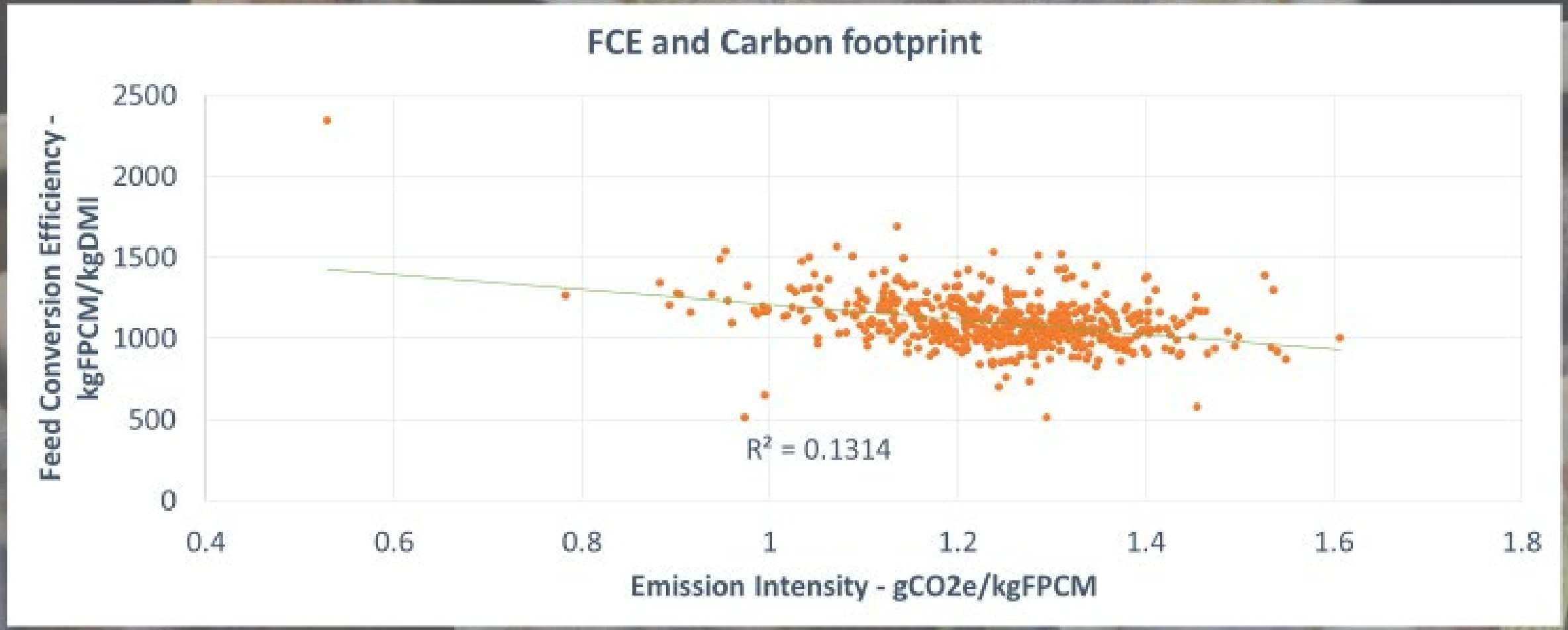
InTouch Precision

Results from 1213 farms in Ireland, UK, France
Based on 2.78mt of feed processed

Average loading accuracy -0.9% (Range +45% to -79%)
Average price accuracy +4.6% (€4,621 /farm)

Feed Accuracy	Accuracy	Cost
Top 10%	0.3%	€7,032
Bottom 10%	20.7%	€58,594
	20.4%	€51,562

Feed Conversion Efficiency



Alltech E-CO$_2$

Measure > Advise > Partner

Alltech®

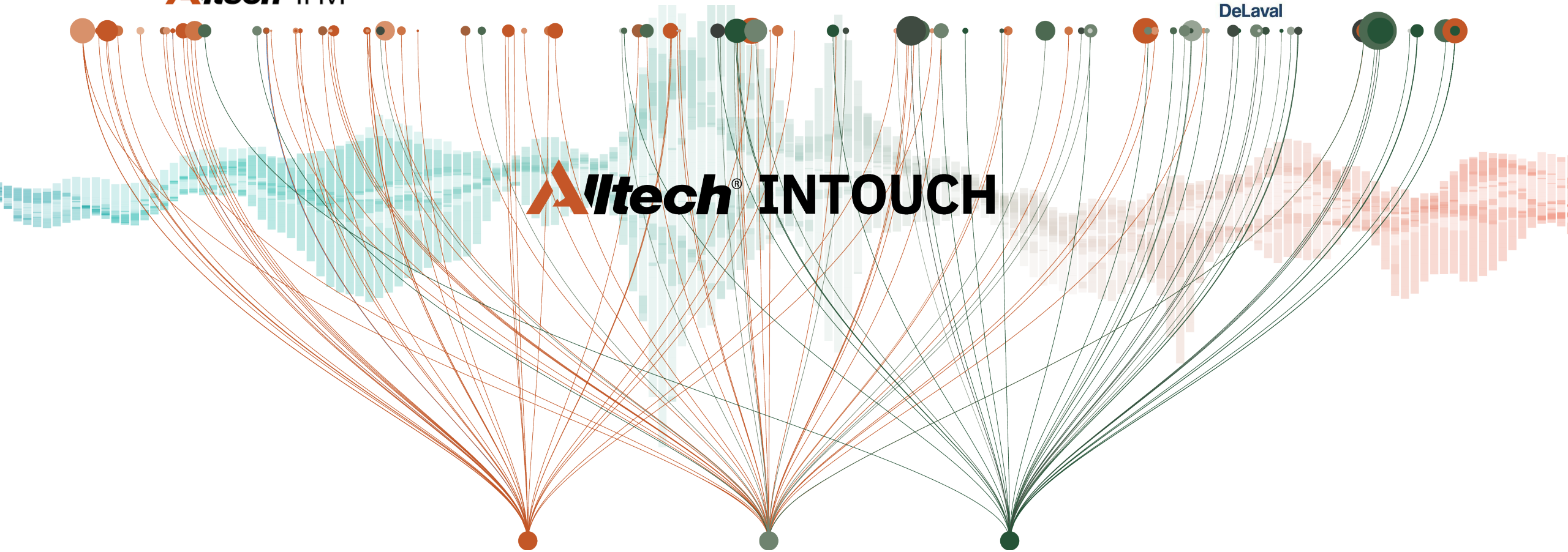
Measure

We gather the vital information needed to gain an understanding of the agri-business system and set goals for improvement. Data is collected on farm and via digital tools.

DATA: We get the Full Picture

TECHNOLOGY PARTNERS

DDW · Microsoft · Chordata™ The Future of Animal Health · TOPCON · vas · FLOX · LELY · dinamica generale® · Alltech® IFM · Allflex® Livestock Intelligence™ · Alltech® E-CO_2 · uniform agri · DeLaval · Google



CHALLENGES

Natural immunity

Production profitability

Environmental sustainability

Advise

The Alltech team has the technical skills, experience and global knowledge base to turn insights into actions. Our team works with industry and independent advisors to provide an advisory service to ensure that goals are achieved.

ADVISORS

- **Relationships**
- **Interpreting data**
- **Setting goals**

Mycotoxin Portal

Online access to comprehensive analyses and insights

Round-the-clock access to the latest mycotoxin test data

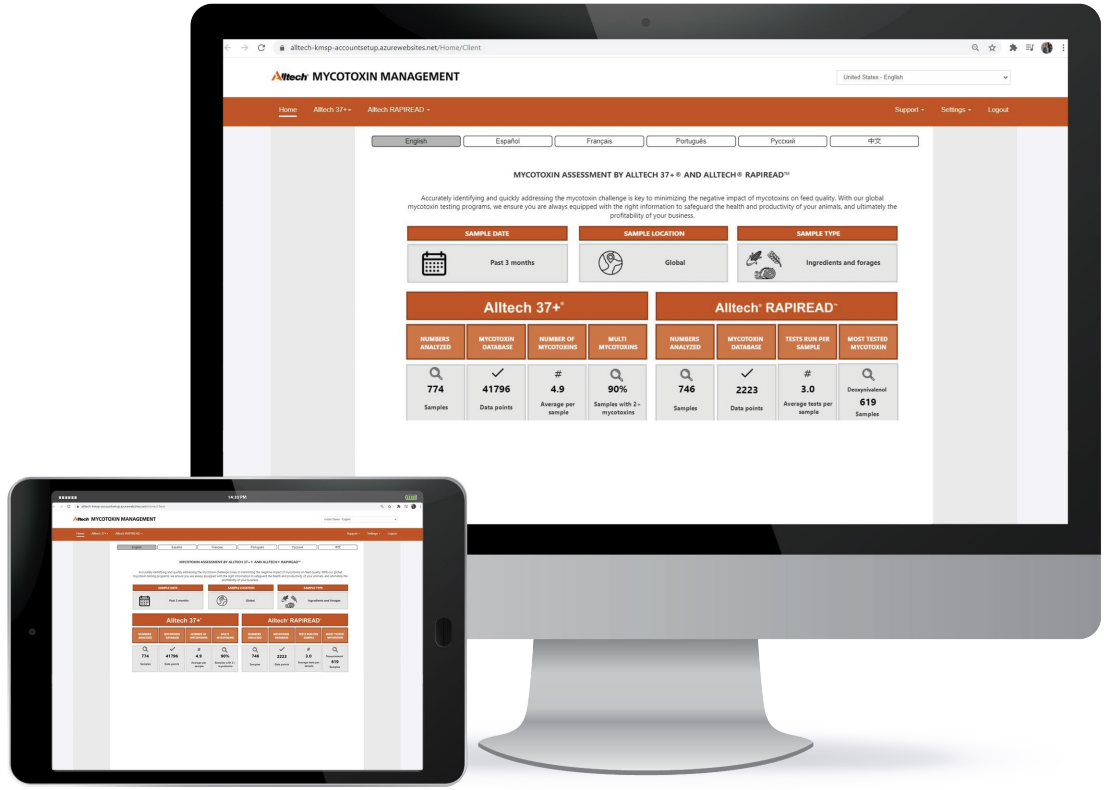
All data stored in one secure location

View global mycotoxin contamination stats

Quickly assess the risk for different species

Compare trends over time

Make informed nutritional decisions



Farm reporting

Your carbon performance

A	<2.00	
B	2.00 - 2.20	
C	2.21 - 2.50	
D	2.51 - 2.80	
E	2.81 - 3.00	
F	> 3.00	

This Assessment: 1.84 kg CO_2e/dozen eggs

Alltech Average†: 2.34 kg CO_2e/dozen eggs

† Alltech averages are specific for your system type and is taken from the carbon result not individual key points of data.

The footprint of a kilogram of eggs is...

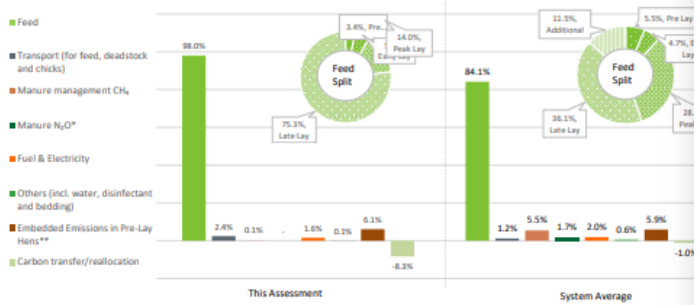
2.49

(kg CO_2e/ kg eggs)

What does "kg CO_2e/dozen eggs" mean?

Kilograms of carbon dioxide equivalent per dozen eggs produced. The sum of all emissions generated on farm in the analysed period, divided by the total number of dozen eggs produced.

Your farm emissions by source



This bar chart demonstrates the percentage contribution towards total farm emissions from the layer enterprise, by their source for this assessment, and a system average.

*Manure may display a minus figure if the credit from exporting manure exceeds the manure emissions on-farm

**Emissions associated with pre-lay hens placed on farm

What does a carbon reduction mean?

If you manage to make a 5% reduction in your carbon footprint, you could save:

102 tonnes CO_2e per year

This would be equivalent to:

67 Cars off the road a year

118 Less return trans-Atlantic flights (LHR - JFK)

Flock period analysed:	01/01/2020 - 31/12/2020	**Laying period:**	66 weeks
System Type:	Conventional	**Breed:**	Lohmann

Crop details

		Alltech Average (Averages are based on previous projects conducted by Alltech E-CO_2)	This Assessment	
Number of egg-laying hens				
At entry	Average	40,390	32,040	birds
At exit	Average	31,809	29,861	birds
Age of egg-laying hens				
At entry	Average	113	112	days
At point of lay	Average	144	140	days
At exit	Average	565	602	days
Weight of egg-laying hens				
At entry	Average	1.28	1.15	kg
At point of lay	Average	1.56	1.35	kg
At exit	Average	1.86	1.70	kg
Feed Conversion Ratio	Average	2.44	2.17	kg feed/kg eggs p

Feed Conversion Ratio (FCR) is an important indicator for efficiency and performance. If FCR is high it could indicate issues with flock health or bird's physical environment. Identifying a high FCR could show an area for a potential increase in flock profitability.
Limiting the amount of feed waste is key to increasing the efficiency of the conversion from feed to egg production.

Output

Total number of eggs produced	Average	14,580,952	13,172,390	eggs
Eggs laid per hen housed	Average	362	411	eggs
Seconds eggs	Average	5.0	5.2	%

Carbon footprint is impacted greatly by the number of eggs laid per hen. A greater number of eggs produced allows for carbon emissions to b offset against a larger volume of product. Management of inputs needs to be balanced against the increased egg production. Limiting waste c allows for an increased conversion of inputs into every kilogram of eggs produced.

Feed

Total feed fed to birds	Average	1,885.62	1,761	tonnes
Total feed fed to birds per day	Average	127.90	120.33	g/bird/day
Total protein fed to birds per day	Average	19.00	19.38	g/bird/day
Available protein % of pre-lay feed		17.22	17.50	%
Available protein % of early-lay feed		17.34	17.00	%
Available protein % of peak-lay feed		16.25	16.00	%
Available protein % of late-lay feed		16.04	16.00	%
Total soya fed to birds	Average	374.65	231	tonnes
Total soya inclusion in pre-lay feed		19.18	15.84	%
Total soya inclusion in early-lay feed		19.42	11.84	%
Total soya inclusion in peak lay feed		19.02	11.60	%
Total soya inclusion in late-lay feed		8.54	13.36	%

Feed has the biggest impact on the carbon footprint of egg production. If grown efficiently, home-grown cereals can be a low carbon feedstuff to the low transport and processing emissions. Feeds like soya have a large emissions tag due to the high processing emissions associated with growing and transporting the crop, as well as the emissions associated with land-use change. An efficient diet plan can help reduce your carbo emissions by monitoring and matching the required feed and protein levels in the layer diet.

Strengths & Opportunities

Milk yield is below average for the system type at 5,356 litres (butterfat and protein are good) – this means that the enteric emissions from the cow are being allocated over a smaller level of production. As discussed, ensure your milk yields are optimised from feed and for cow type to ensure herd productivity is maximised and emissions minimised. The largest dairy herd cost, feed, almost certainly offers potential for improving profitability and carbon performance. Ensuring the correct balance of feeds in daily diets to give the most efficient rumen fermentation, is another area offering major potential for improvement. Lower milk yields can often be attributed to cow comfort in housing. Lower milk yields are not always due to the feed that the animal consumes. Look into aspects such as fertility, the overall health of the animal and the numbers of lame cows. These can all affect cow productivity and feed may not resolve these. If the average milk yield was increased from 5,356 to 6,000 per cow from the same feed and system type, the emissions would be reduced from 1,425 to 1,304 g CO2e per kg FPCM.

Yield from forage is 2,419 which is a little low compared to the average - maximising the yield from forage will reliance on bought-in feeds with high associated embedded emissions. Continue to monitor and analyse the forage quality, as this will allow you ensure that silage quality is maintained and effectively balanced with purchased feeds. Whether grazed or fed silage, grass provides over half the dry matter intake of most dairy cows. This means small improvements in utilisation can have a major impact on production costs. To ensure your milk yields are optimised from feed and for cow type to ensure herd productivity is maximised and emissions minimised, evaluate your cattle manure consistency to assess the digestibility of your feed ration. Dung sieve testing allows you to analyse the digestibility of feed and rumen fermentation. If you were to reduce reliance on bought-in feeds by 10%, by further optimising the yield from forage and maintaining milk yield, the carbon footprint for milk production would be reduced by 21 g CO_2e per kg FPCM, from 1,386 to 1,365 g CO_2e per kg FPCM.

The fertiliser use is four times as high as the system average and now accounts for 22% of the overall production emissions (average is a 9% contribution). To reduce fertiliser usage, look to analyse muck and manures as changes in animals and diets can impact the NPK content. Assuming a 6% dry matter slurry, this could potentially have a nutrient value of 1.2 kg N per m^3 available to crops. Alongside this, ensure soil analysis is conducted frequently to calculate N, P, K and S requirements, so the correct level of artificial fertiliser is applied, matching nutrient supply to crop requirement. Also look into the possibility of practices such as aeration and sub soiling to help improve soil structure and in turn increase productivity from grass. Improved soil structure will additionally reduce fertiliser runoff and N_2O emissions from soil. If fertiliser use is reduced by 1/4, then the emissions would be reduced by 68 g CO_2e per kg FPCM, from 1,386 to 1,318 g CO_2e per kg FPCM.

Next steps

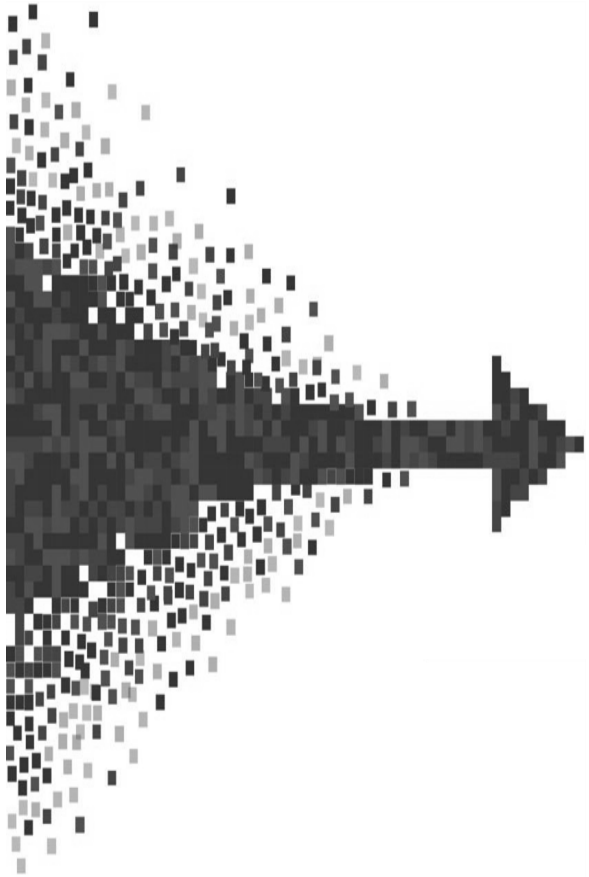
To improve your on-farm efficiency, profitability and sustainability you should aim to:

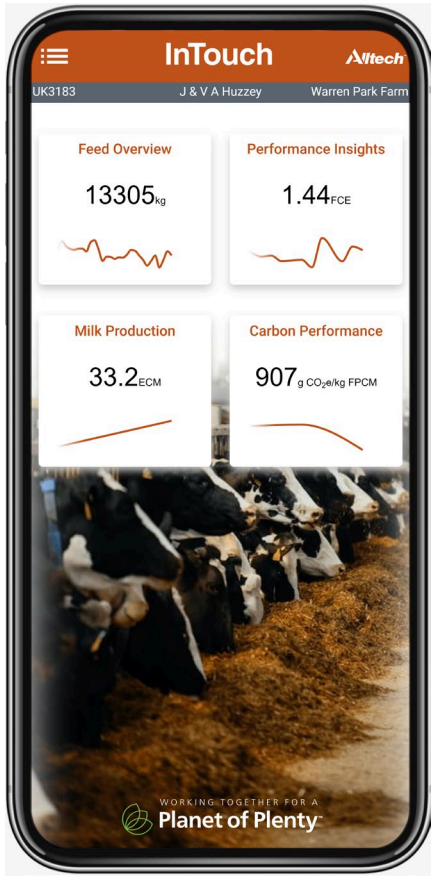
- Continue to optimise milk yield and quality
- Monitor the feed rate, ensuring that the yield from forage is optimised as much as possible
- Ensure the use of fertiliser is optimal for the land and manures are used to full potential

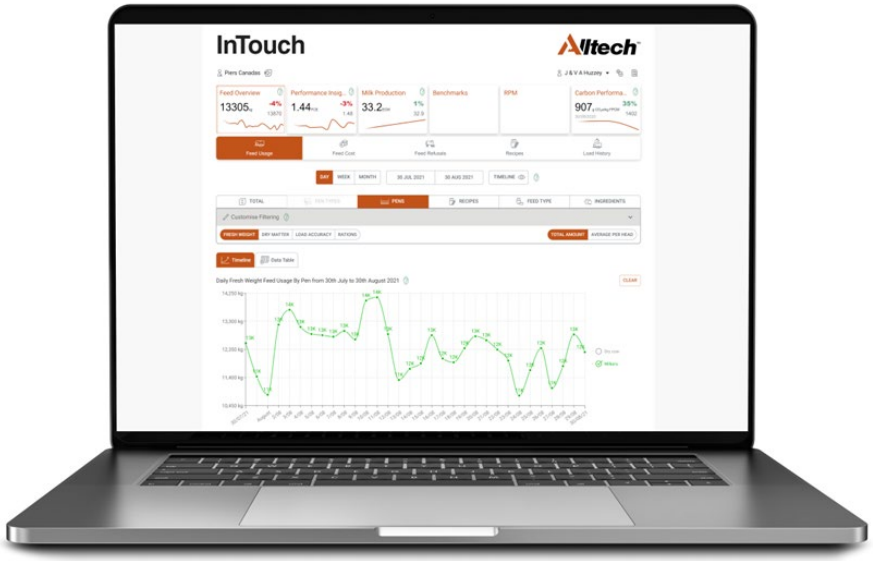
InTouch

Insights for advisors, all in one place.

37+
RAPIREAD
IFM
Formulate
Alltech E-CO_2
SCC and mastitis
MUN and BUN
Milk solids
Manure scoring
Colostrum quality
Heifer measurement
Scouring score
Mobility score
Body condition score
Rumen fill
Urine assessment
Reproduction assessment
Silage analysis
Silage temperature







Partner

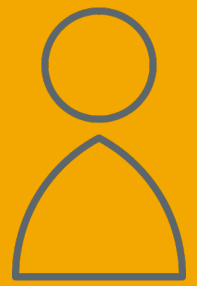
Ongoing, long-term, practical support from Alltech and our supply-chain partners. We believe that we need to work as a team to ensure the accurate implementation of advice and guarantee success!

The trusted ADVISOR

Alltech® Advisor

Veterinarian

Feed mill advisor



Independent farm consultant

Food processor advisor

Alltech support and training

Industry-leading ADVISORS

PARTNERSHIPS

On-farm MEASUREMENT tools

ADVICE to resolve challenges

PARTNERING with food-system stakeholders

Alltech®

Partnering to create and share **VALUE**

"By sharing data and insights, we empower advisors to solve agri-food-system challenges and drive the transfer of value from the consumer through the processor to the farmer"


Working
Together
for a
Planet
of Plenty™
Alltech®