FVE Federation of Veterinarians of Europe

FEDERATION OF VETERINARIANS OF EUROPE

Embracing Sustainability in Veterinary Practice

David Black

12th May 2022

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VetSalus

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Vet Sustain
Championing Sustainability In The Veterinary Professions
Leveraging change for a sustainable future;
Empowering
Enabling
Inspiring

What do we mean by Sustainability?

Meeting our own needs without compromising the ability of future generations to meet theirs.

Regenerative Practices?

What are the issues?

We have been warned that we have only **12 years to avert a climate and ecological disaster** that would threaten human civilisation and the natural world

Nature is declining globally at unprecedented rates — and the rate of species extinctions is accelerating, with grave impacts on people around the world now likely

75% of new infectious diseases are zoonotic – many originating as a result of human behaviours at the animal-human-environment interface

We have been warned that **the threat of antibiotic resistance** is as great as that from climate change – threating the lives of an estimated 10 million people by 2050

Animal welfare challenges persist in our domestic species, with increased risks to standards in the UK with impending post-Brexit trade agreements

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United Nations Sustainable Development Goals (SDGs)

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Veterinary Sustainability Goals

Diverse and abundant wildlife

Conserve and enhance natural landscapes, habitats and biological diversity and abundance of wild terrestrial and aquatic plant and animal species.

A good life for animals

Safeguard and advocate for the health and welfare, in life and at the point of death, of animals under our care and those that are affected by human activity.

Net zero warming

Implement and promote decarbonisation through energy efficiency, the generation and use of renewable energy, mitigation of global warming and sequestration of carbon.

Health and happiness

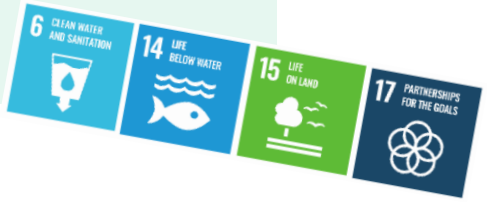
Safeguard and enhance the physical and mental wellbeing of people and support a transition to livelihoods and lifestyles that are fit for the future.

A no-waste society

Minimise the usage and disposal of resources and materials, and support a transition to a circular economy.

Enough clean water for all

Uphold best practice in fresh water conservation and protection to mitigate water stress and prevent water pollution.



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This matters...

RCVS SETTING VETERINARY STANDARDS

" I PROMISE AND SOLEMNLY DECLARE that I will pursue the work of my profession with integrity and accept my responsibilities to the public, my clients, the profession and the Royal College of Veterinary Surgeons, and that, ABOVE ALL, my **constant endeavour will be to ensure the health and welfare of animals committed to my care**."

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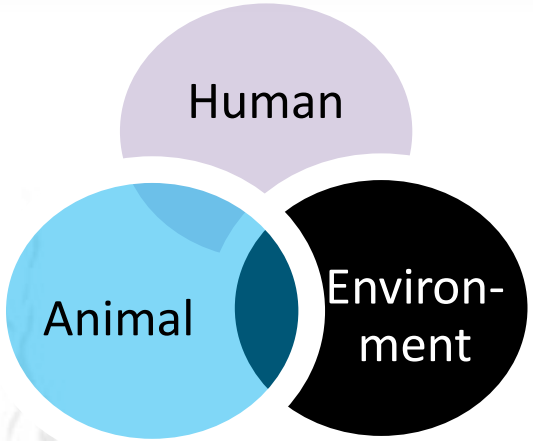
Veterinarians typically live and work at the animal- human- environment intersection



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Veterinarians typically live and work at the animal- human- environment intersection

COP26 Stand Concept

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Influencing the agricultural sector

Inform ourselves, understand the science, technology and terminology

- Understand the science (eg GWP*, carbon footprints,)
- Understand the terminology (organic, regenerative, sustainable +/- intensification)
- Be aware of legislation and policy (The Agriculture Act 2020, Farming Rules for Water, Farming is Changing, ELMS, Animal Health and Welfare Pathway etc)
- Optimise health and welfare at all times (BVA Policy on Sustainable Agriculture)
- Understand the impacts of genetics/genomics and (advanced) breeding
- Ensure responsible medicine use across clients' farms – we are the gatekeepers
- Consider feed conversion efficiency as well as land use efficiency

Net Zero will be Impossible without Farming

Farming is part of the solution to global warming

GWP* - improving efficiencies by 0.33% pa will contribute to global cooling

If all dairy cattle had UK yields, global milk supply could be maintained with 181 million fewer cows (69%)

Jude Capper – BCVA 2021

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Sustainability within Farm Animal Practice

- Disease control and eradication
  - Increasing productivity and efficiency
  - Decreasing antimicrobial usage
  - Increasing vaccinations
  - Reducing losses
- High levels of welfare
  - Animal Welfare Bill 2021
- Improving the genetics of the national herd
  - Genomics and Epigenetics
  - Advanced Breeding techniques

BVD Free

JOHNE'S ACTION
BCVA Accredited
Johne's Veterinary Adviser

FlockCheck 2021

#ActionForAnimals

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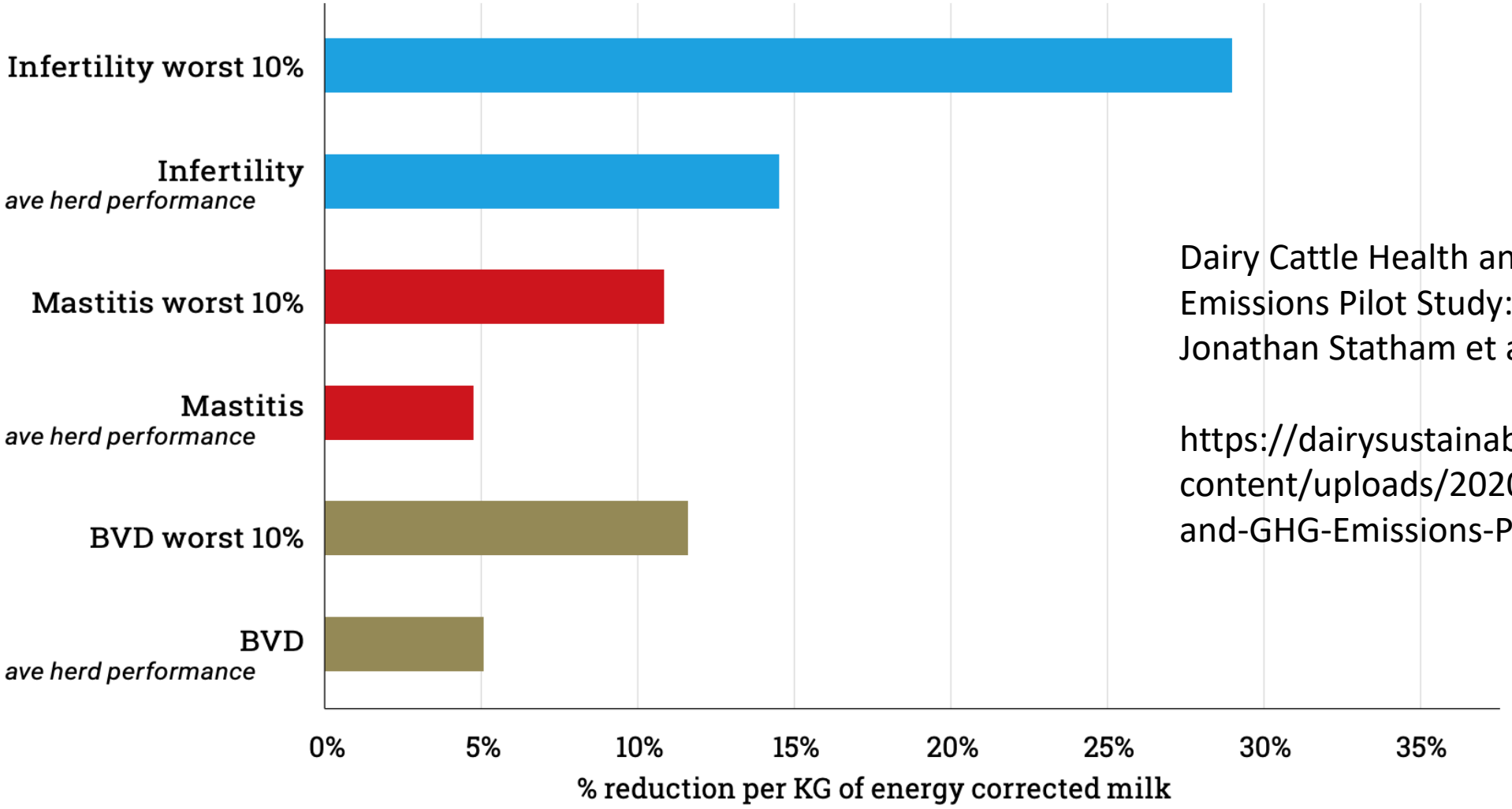
Potential reductions in GHG Intensity of Milk Production – UK



Dairy Cattle Health and Greenhouse Gas Emissions Pilot Study: Chile, Kenya and the UK
Jonathan Statham et al 2020

https://dairysustainabilityframework.org/wp-content/uploads/2020/10/Dairy-Cattle-Health-and-GHG-Emissions-Pilot-Study-Report.pdf

Figure 5: Potential reductions in GHG intensity of milk production in the UK, showing performance of average and worst 10% of herds

How do we define Animal Welfare?

- Brambell Report - 1965
- The Farm Animal Welfare Council (FAWC) 1979
- The concept of the “Five Freedoms”

More recently, with better scientific understanding it has been suggested that the Five Freedoms focus too much on poor welfare and suffering

“For animals to have “lives worth living” it is necessary, overall, to minimise their negative experiences and at the same time to provide the animals with opportunities to have positive experiences.”

Mellor 2016

An Introduction to Sustainability in Farm Vet Practice

An Introduction to Sustainability in Farm Vet Practice

A Case Study Series Compiled by the Vet Sustain Food and Farming Working Group

March 2021

In Association with :

VetSalus

Vet Sustain

The environmental impact of antimicrobials

Alasdair Moffett BVMS, MSc, MRCVS, Veterinary Surgeon at Synergy Farm Health

Multiple pathways exist for antibiotics to enter the environment. A 'One Health' perspective that incorporates the complex relationship between animals, humans and the environment is therefore essential to tackle antimicrobial resistance, (AMR) effectively. The whole AMR story has driven the sort of vetting we all aspire to do, and the vetting which should form part of our future. Working together with farmers to produce healthy productive livestock, whilst minimising the need for antimicrobial intervention is the goal for each, and every one of us.

Animal Health

Keeping animals healthy is key to reducing the necessity for antibiotic treatment. Knowledgeable animal husbandry is cited as the most important factor in reducing antibiotic use, but other management practices, such as correct stocking density, improved nutritional programmes, vaccination strategies, optimal housing and ventilation, slurry management and genetic selection can all be adopted to minimise the need for antibiotic use.

Reducing prophylactic use also has a key role: for example the last 5-10 years have seen a shift from routine intramammary treatment of all cows at dry-off, to selective treatment based on pre-existing mammary infections.

Antibiotic alternatives

Metals such as copper, zinc, or arsenic are commonly used in animal feeds as alternatives to antibiotics. However, antibiotic resistance can be co-selected by metals, and the bio-accumulation in soils (notably of copper) both potentially limit the contribution of their use in tackling AMR. Other alternatives, such as herbal materials, may be worth pursuing, although by definition, their antimicrobial activity can also select for resistance.

...tic use in animal agriculture

...current lack of data on how on farm use ...tics specifically affects the presence of ... genes in bacterial communities (the ... in the immediate farm and wider ...t. This is currently a project under way ... Farm Health and the RVC.

...se and types of antibiotics in animal ...particularly those of greatest ... human health, is the most direct ... controlling agricultural antibiotic ...e environment, and likely also ...nce.

Veterinary Engagement in Sustainable Pig Farming

Tom Hill BVSc MRCVS and Ed Bailey BVSc CertAVP (Cattle) MRCVS, George Vet Group

...k production can be a highly sustainable form of livestock production, based on the ability of the ...o thrive on a wide range of diets. By-products from the food industry, crop residues and cereals ...h don't make the grade for human consumption can be transformed into meat much more ...iently by pigs than by ruminants. For millennia humans have used the ability of pigs to turn ...e or over-abundance into a versatile meat which is a cornerstone of many national cuisines. ...use is the main driver for global warming potential and so feed efficiency and feed sourcing are ...l factors for sustainability. The land sparing versus land sharing arguments apply here, with ...ower in imported soya potentially resulting in reduced emissions but higher land use area[2,3]. ...ay play an important role in mixed farming operations as we seek to improve our diets and ...lth, while reducing our environmental impacts from food production[4].

...eterinary sector is relatively small but has ...way in positioning itself as a highly ... source of independent specialist ...for proactive farmers.

...rcial pig vets, the aim is to produce the ...pigs, with the highest welfare, and as ... as possible. Progress with feed ...efficiency and daily liveweight gain has ... impact on sustainability, with ...gases per unit of product reduced by ...n 2000 and 2017[1]. Feed makes up ...he carbon footprint of pork and so ...mall changes to feed conversion ...major impacts.

...e a key role in driving these ...his has been achieved with a ...high welfare and a much higher ...K producers raising pigs outdoors ...ther major producers[1].

Historically antibiotic use has been high, but progress in reduction has been remarkable. Antibiotic use averaged 278mg/PCU in 2015 but has reduced by over 60% to 110mg/PCU in 2019[5]. RUMA, PVS and many other stakeholders are working hard to reduce this further. Use of AHDB's electronic medicine book has allowed vets to graphically show farmers their usage, and how they compare with similar producers. This benchmarking has opened discussion and is a real driver for reduced antibiotic usage.

Photo credit - Helen Bowning Organics

Talking all things carbon

...MSc, MRCVS, Veterinary Surgeon at Synergy Farm Health

...ience in Livestock ... Carbon and UK ...20.

...ion greenhouse ...y against global ...e CIEL 2020), ...oduction and ...ad would not ...net zero.

...ases (GHGs) ...ing, manure ... followed by ...ity). In 2018 ...represented ...s.

...emissions ...mal vets. ...hether by ...Dairy and ...Charlotte ...cument), ...or less, ...g Daily ...carbon ...ents in ...s – for ...rsagia ...GHG ...rease

Reducing the use of inorganic fertilisers when producing forage, and effective utilisation of manure are additional key areas to target. Finally, improving genetic selection of ruminant livestock to boost fertility, feeding efficiency and health through improved immunity to common diseases can contribute to a reduction in carbon emissions, combined with gains in profitability.

End Note: Measuring methane and its carbon equivalence is a topic of hot debate, relating to the relatively short half-life of methane, which is not captured by current metrics. For those interested, see Frontiers | Agriculture's Contribution to Climate Change and Role in Mitigation Is Distinct From Predominantly Fossil CO2-Emitting Sectors | Sustainable Food Systems (frontiersin.org), and Climate change, ruminant methane and GWP – Vet Sustain for further discussion on this topic.*

...on and UK Livestock. ...09/CIEL-Net-Zero-Carbon-UK-Livestock_2020_Interactive.pdf

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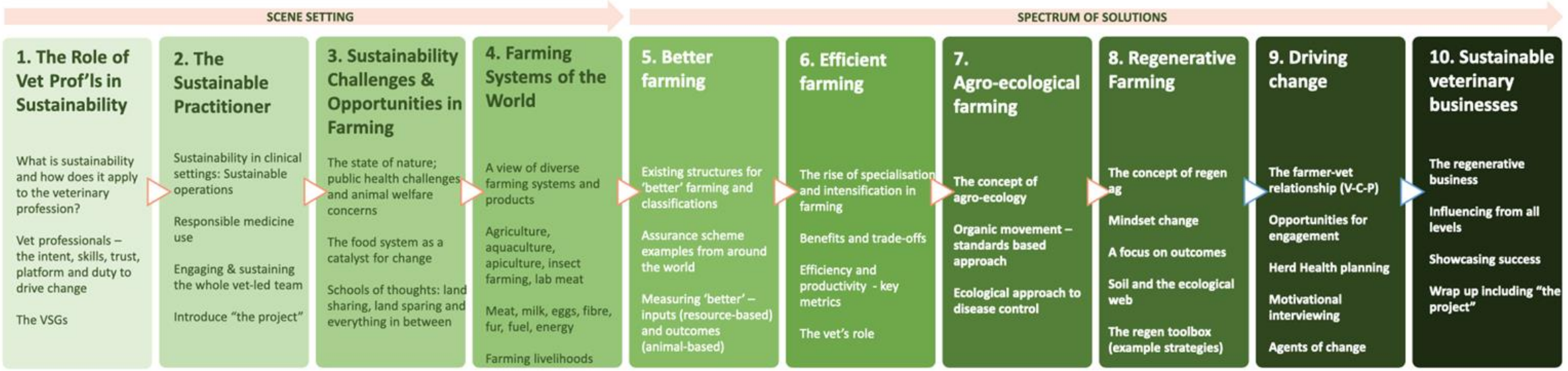
A Veterinary Approach to Sustainable Food & Farming



- Hosted on an e-learning platform
- 10 module course accredited with LANTRA
- Available to entire veterinary team
- To be launched by VetSalus & Vet Sustain in Summer 2022

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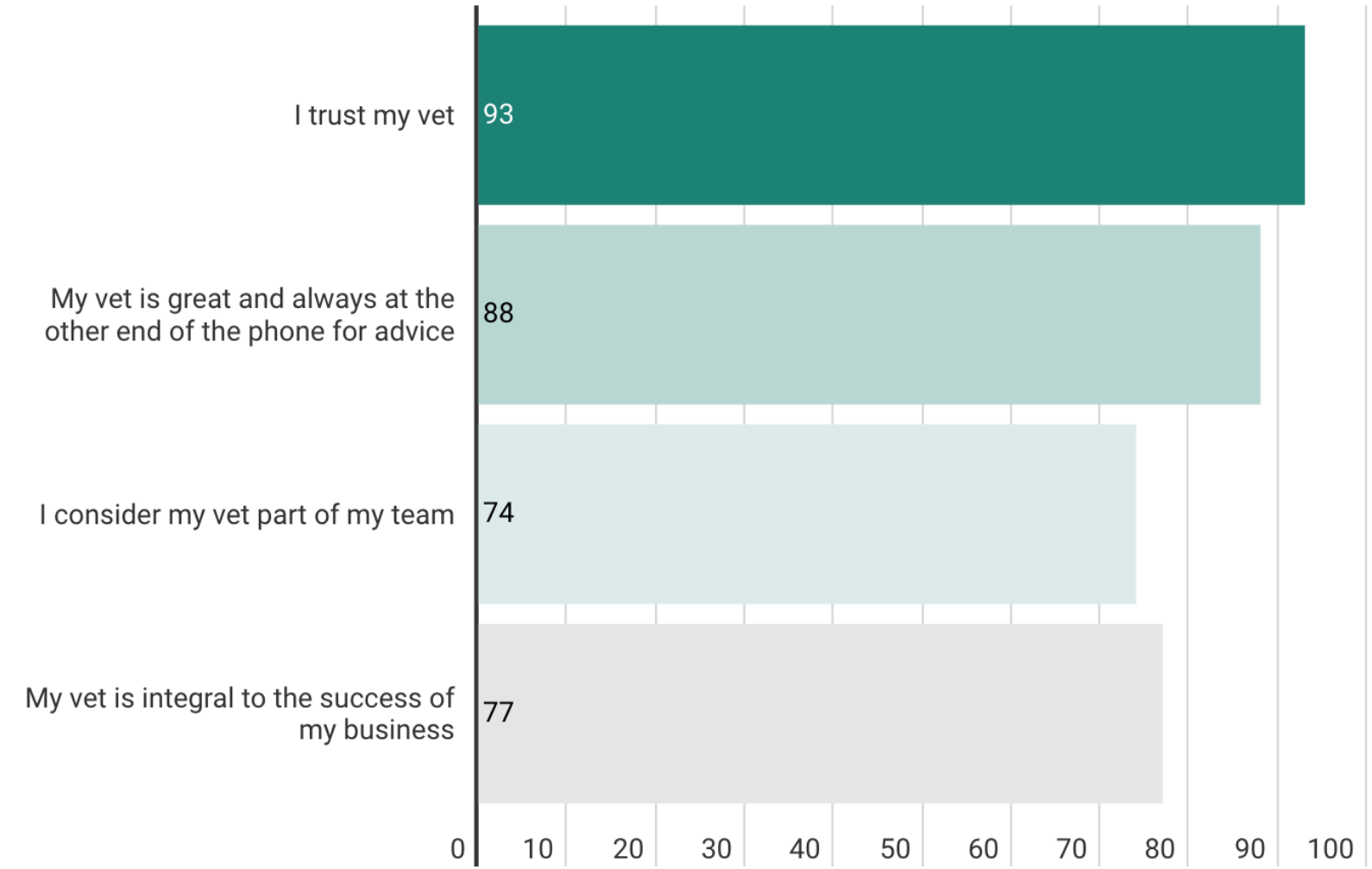
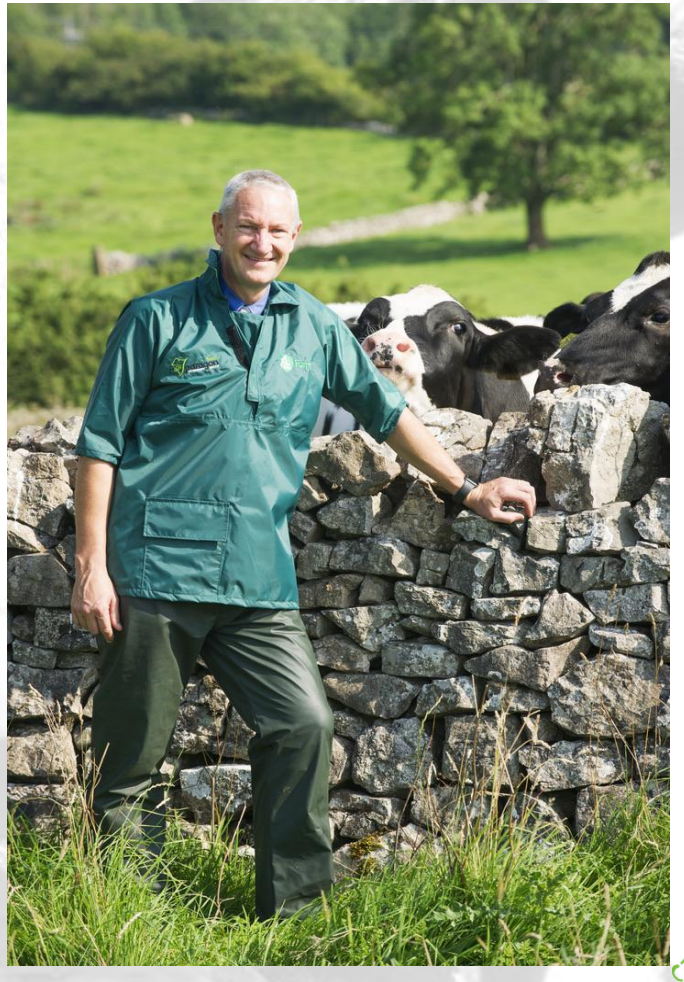
Trusted Professionals – Farmers' Opinions

Survey supported by XLVets and VetPartners (2021)



Advocacy



The CO_2e impact of animals under our care

Average individual human carbon footprint in the UK;
13.4 tonnes of carbon dioxide equivalent (CO_2e) per year.

SPECIES	AVERAGE TOTAL CARBON FOOTPRINT OF ALL THE ANIMALS UNDER THE CARE OF EACH VET PER YEAR
EQUINE	524 tonnes CO_2e per vet per year
DOGS AND CATS	1,000 tonnes CO_2e per vet per year
SHEEP	7,000 tonnes CO_2e per vet per year
DAIRY CATTLE	24,000 tonnes CO_2e per vet per year
PIGS	27,000 tonnes CO_2e per vet per year
BEEF CATTLE	30,000 tonnes CO_2e per vet per year
FARMED FISH	36,000 tonnes CO_2e per vet per year
POULTRY	99,000 tonnes CO_2e per vet per year

	ANNUAL UK CARBON FOOTPRINT (IN MILLION TONNES CO_2E)	REFERENCES
DAIRY	18.4	AHDB, 2014; Shahbandeh, 2020
BEEF	15.4	Poore and Nemecek, 2018; Defra, 2020b
POULTRY (MEAT + EGG PRODUCTION)	9.6 (7.5 + 2.1)	Taylor *et al.*, 2014; Poore and Nemecek, 2018; Defra, 2020a; Egg Info, 2021
CAT	4.3	Okin, 2017; PDSA, 2020
DOG	3.9	Okin, 2017; PDSA, 2020
PORK	2.7	Poore and Nemecek, 2018; Defra, 2020b
LAMB	1.9	Poore and Nemecek, 2018; Defra, 2020b
HORSE	1.0	Engel *et al.*, 2012
FISH	0.8	Organisation for Economic Co-Operation and Development, 2021; MacLeod *et al.*, 2020

Prentis, A. Carbon Footprint of the animals under our care, Veterinary Practice, 1st March 2021 online version.

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Regenerative Agriculture

Regeneration is based on

- Diversity and connectance
- Use principles not prescriptions
- Observe and listen
- Right animals, right place, right time
- Soil health is critical

Gabe Brown – Five Principles

1. Minimal Mechanical Disturbance
2. Diversity - of Plants and **Animals**
3. Protect and cover the soil
4. Maintain active root systems
5. Integrated **Livestock** Systems

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Complexity – humans don’t do it so well

Credit - Alex Thomlinson

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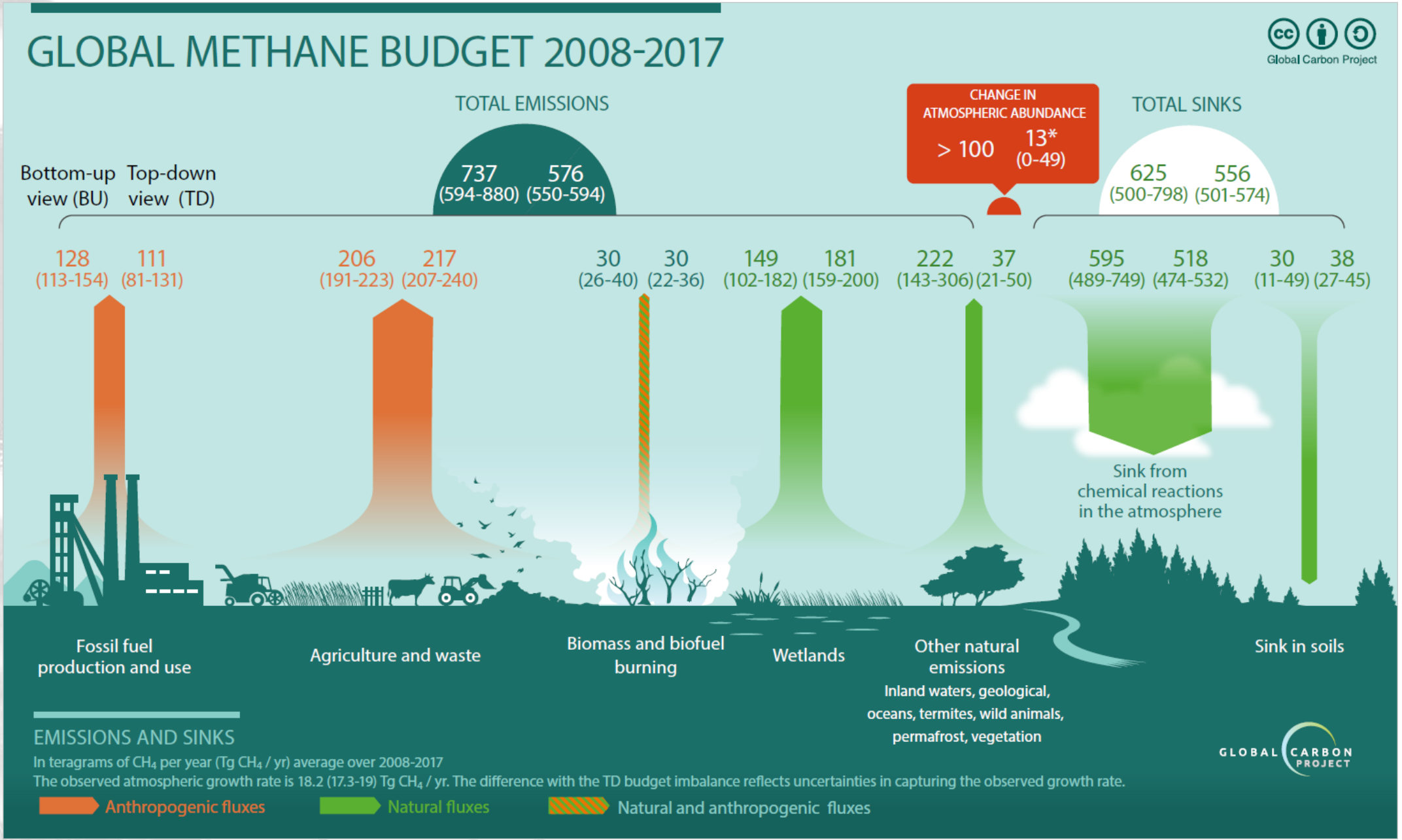
Problems arise in degraded systems

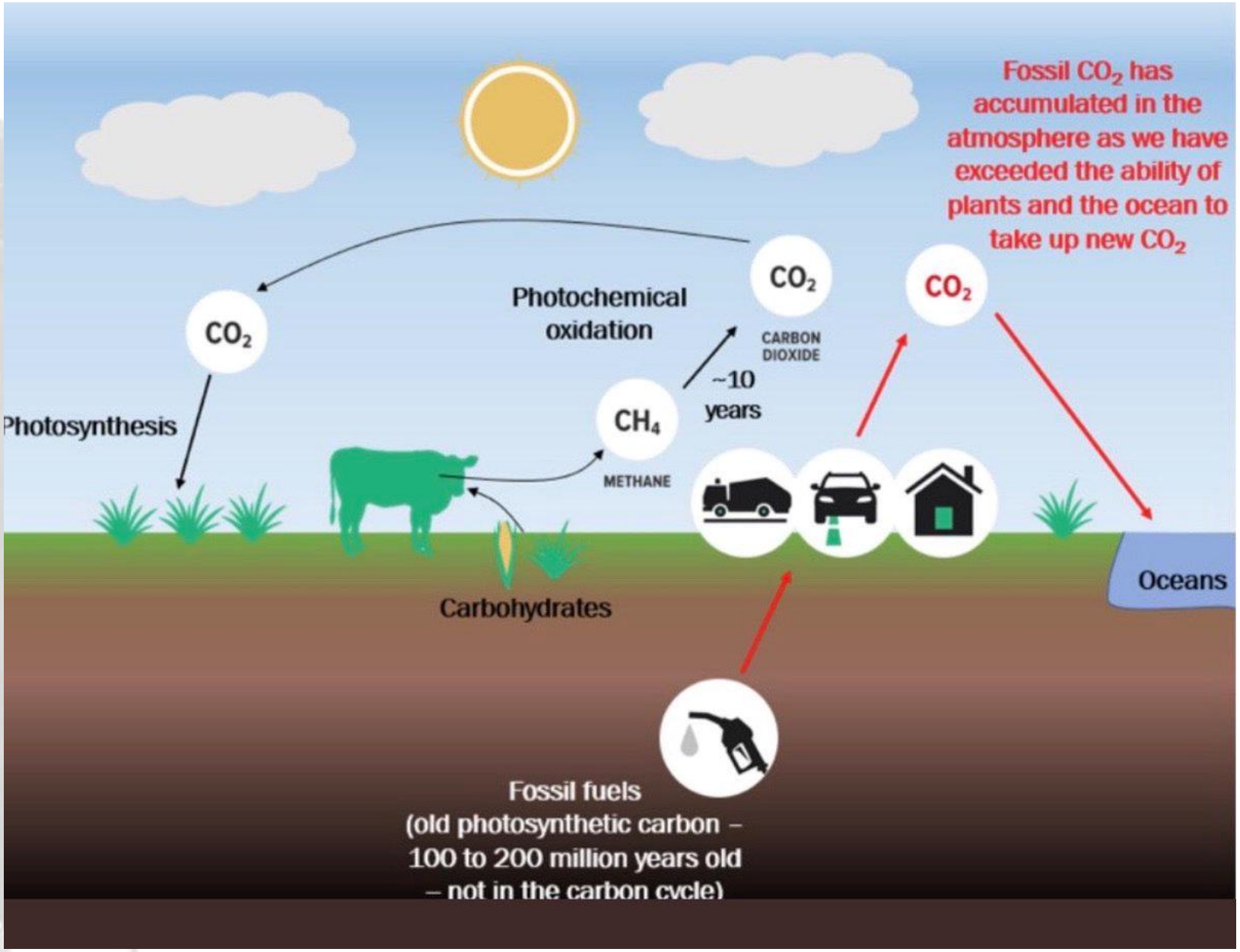
- Complexity is lost
- Landscapes are vulnerable and fragile
- Functionality is compromised
  - Sunlight capture is compromised
  - Minerals, nutrients and water don’t cycle as well
- Animal health is compromised
  - More medical interventions and other inputs are required
  - Problem species emerge

Credit - Alex Thomlinson

Methane


GLOBAL METHANE BUDGET 2008-2017
Global Carbon Project
TOTAL EMISSIONS
737 (594-880)
576 (550-594)
Bottom-up view (BU)
Top-down view (TD)
CHANGE IN ATMOSPHERIC ABUNDANCE
> 100
13* (0-49)
TOTAL SINKS
625 (500-798)
556 (501-574)
128 (113-154)
111 (81-131)
206 (191-223)
217 (207-240)
30 (26-40)
30 (22-36)
149 (102-182)
181 (159-200)
222 (143-306)
37 (21-50)
595 (489-749)
518 (474-532)
30 (11-49)
38 (27-45)
Sink from chemical reactions in the atmosphere
Fossil fuel production and use
Agriculture and waste
Biomass and biofuel burning
Wetlands
Other natural emissions
Inland waters, geological, oceans, termites, wild animals, permafrost, vegetation
Sink in soils
EMISSIONS AND SINKS
In teragrams of CH4 per year (Tg CH4 / yr) average over 2008-2017
The observed atmospheric growth rate is 18.2 (17.3-19) Tg CH4 / yr. The difference with the TD budget imbalance reflects uncertainties in capturing the observed growth rate.
Anthropogenic fluxes
Natural fluxes
Natural and anthropogenic fluxes
GLOBAL CARBON PROJECT

The Biogenic Cycle



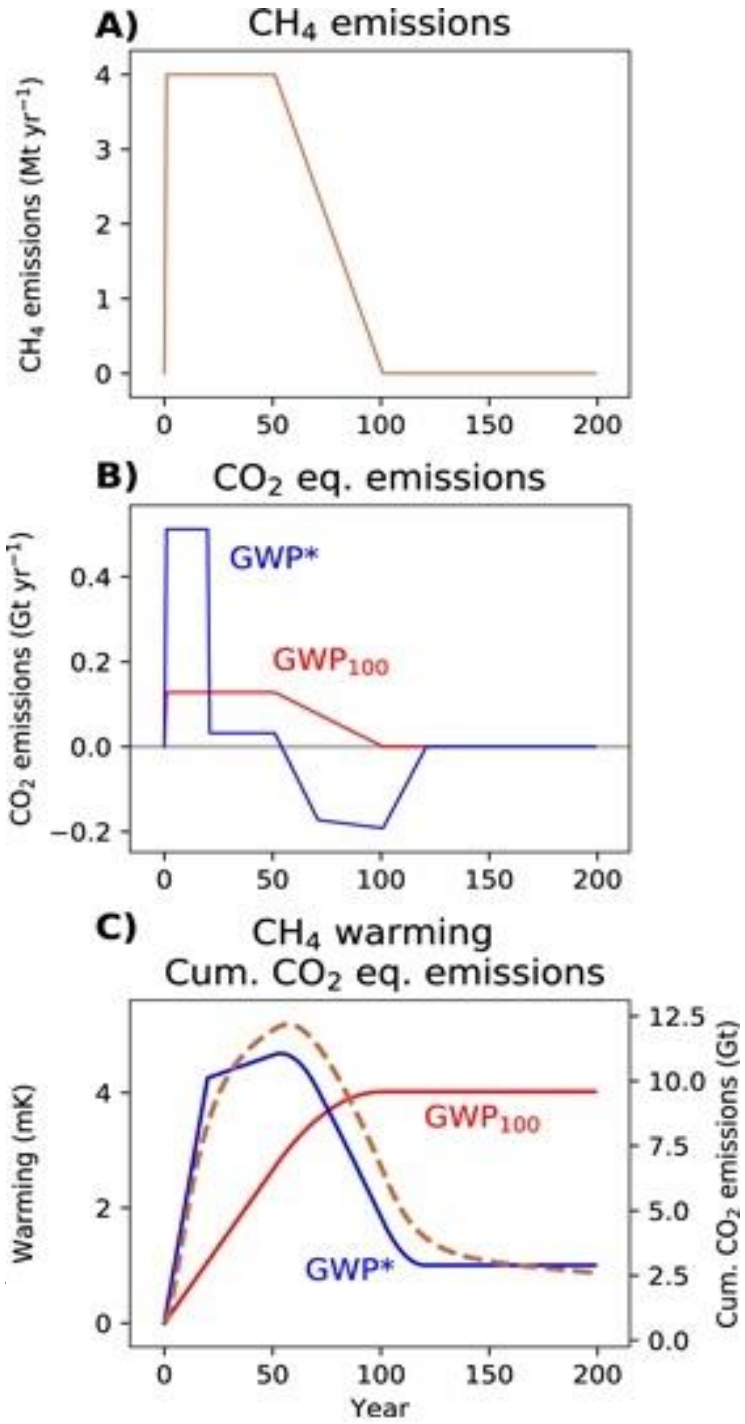
Credit
Frank Mitloehner
UCDavies

GWP* vs GWP_{100}

CH4 28 times more potent than CO2
But oxidises over ~12 years

Figure 4 from;

Demonstrating GWP*: a means of reporting warming-equivalent emissions that captures the contrasting impacts of short- and long-lived climate pollutants
John Lynch et al 2020 Environ. Res. Lett. 15 044023
doi:10.1088/1748-9326/ab6d7e



A demonstration of (A) a step-change to sustained CH_4 emissions for 50 years followed by a decline to 0 emissions over the following 50 years, and (B) corresponding annual CO_2-equivalent emissions using GWP_{100} or GWP* (red and blue lines, respectively), followed by (C) the warming resulting from those CH_4 emissions (dashed orange line) overlaid with cumulative GWP_{100} and GWP* CO_2-equivalent emissions (solid red and blue lines, respectively).

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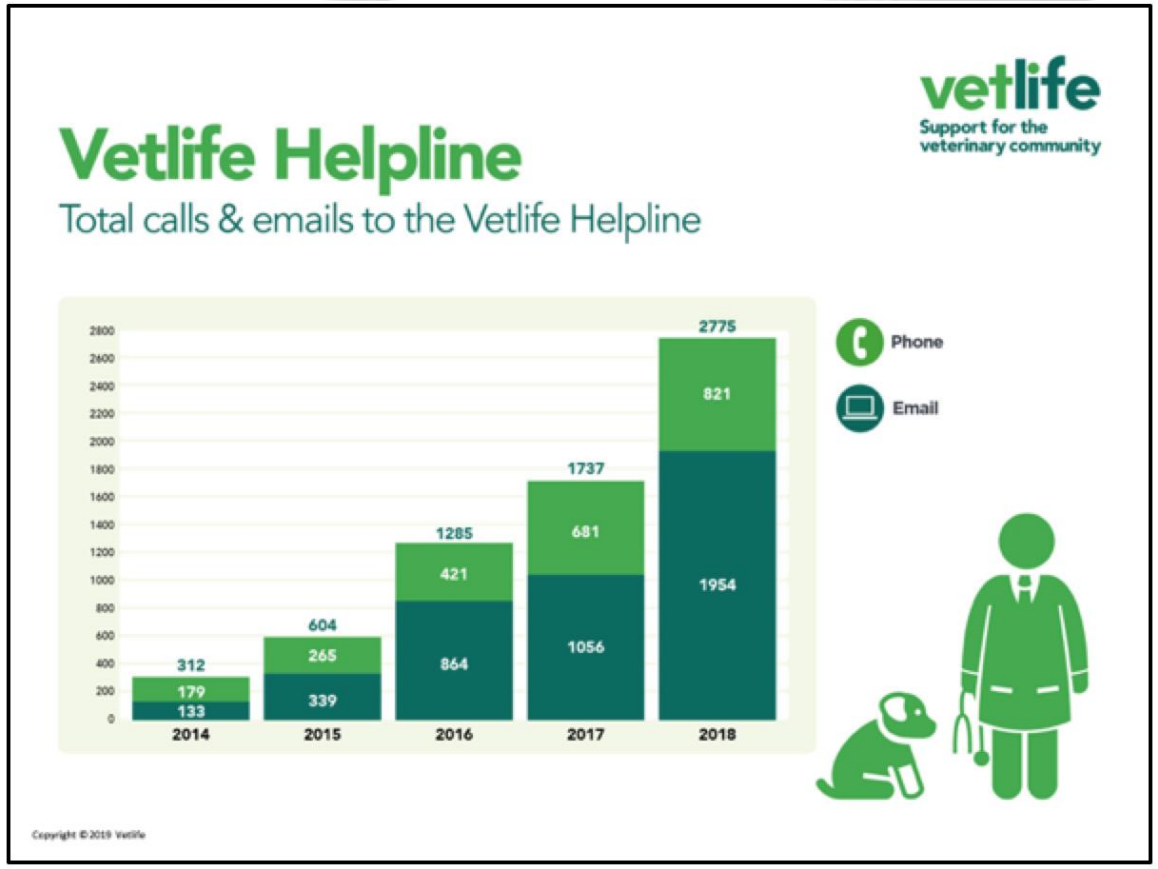
Veterinary Mental Health



BVA NEWS

Vetlife Helpline celebrates its 30th anniversary

The 24/7 support service Vetlife Helpline is entering its 30th year of providing confidential support to the veterinary community.

VETLIFE – with its three services, Vetlife Helpline, Vetlife Health Support and Vetlife Financial Support – has been supporting the veterinary profession for more than 100 years. The centrally administered Helpline service is currently provided by 93 volunteer responders. The team of volunteers are all veterinary professionals and three dedicated members will celebrate 25 years' service this year.

A busy time for Vetlife

The past two years have brought unprecedented challenges for the veterinary community and also for the Vetlife Helpline, which has responded to more than 7000 contacts for support over the pandemic period. In 2021 alone, Vetlife Helpline volunteers responded to 3390 contacts by email and telephone – an average approaching 10 contacts every day.

Common themes raised by those seeking support during 2021 included mental health concerns (56 per cent) and stress (38 per cent), with further work-related issues ranging across job demands, concerns about support at work, working conditions, work-life balance, and more. Callers experiencing physical health problems, family and relationship issues, bullying, self-harm, bereavement, and violence and abuse were also supported, as were the eight per cent of callers who discussed suicidal thoughts or behaviour.

Commenting on the nature of contacts received over the past year, Vetlife Helpline Manager Rosie Allister said: 'Confidentiality is at the core of what Vetlife Helpline does. When we talk about these themes and numbers of contacts we never identify situations or people but these numbers represent real people in real situations. We are glad they got in touch with us and gave us the opportunity to try to help. It's a privilege to be part of a helpline that has been supporting the veterinary professions for 30 years. I'd like to encourage anyone who is thinking of getting in touch not to hesitate, we are here for you.'

• Vetlife Helpline is available 24 hours a day, 365 days a year on 0303 040 2551 or via anonymous email at https://helpline.vetlife.org.uk/

In 2021; 3390 contacts – 56% Mental Health, 38% Stress Related

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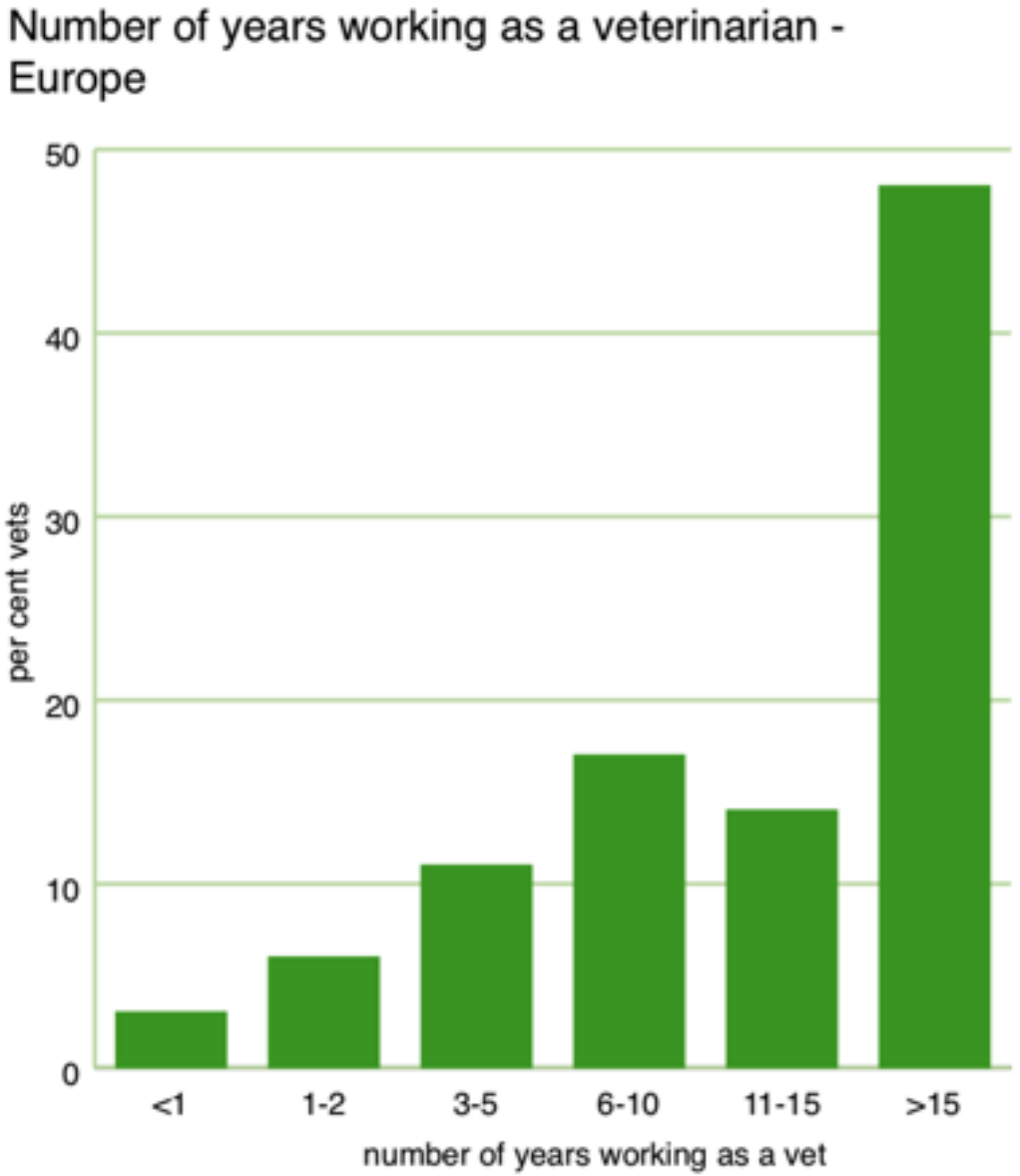
Expectations

Do you feel your career to date has met, or exceeded your expectations?



FVE Survey of the Veterinary Profession in Europe - 2015

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59% OF VETS FEEL THEIR CAREER HAS MET, OR EXCEEDED, EXPECTATIONS

VETFUTURES

Base: 535

To what extent has your working life matched the expectations you had when you first entered the profession?

Much better than expected – 7%

Slightly better than expected – 14%

- More likely to be: retired/not practising, earning >£55k, >55yrs, not in small/mixed practice, men

As expected – 38%

- More likely to be: business owner/partner, in mixed practice

Only met some expectations – 38%

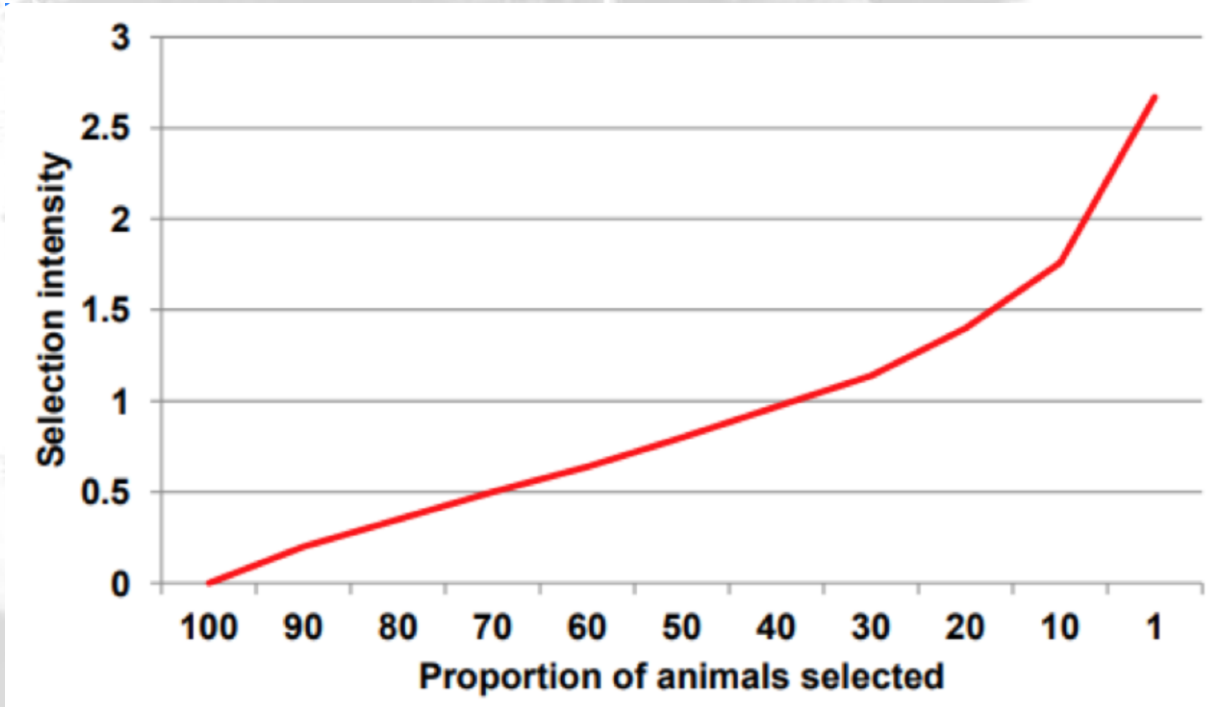
- More likely to be: qualified <15yrs, <35yrs, women, intending to leave the profession

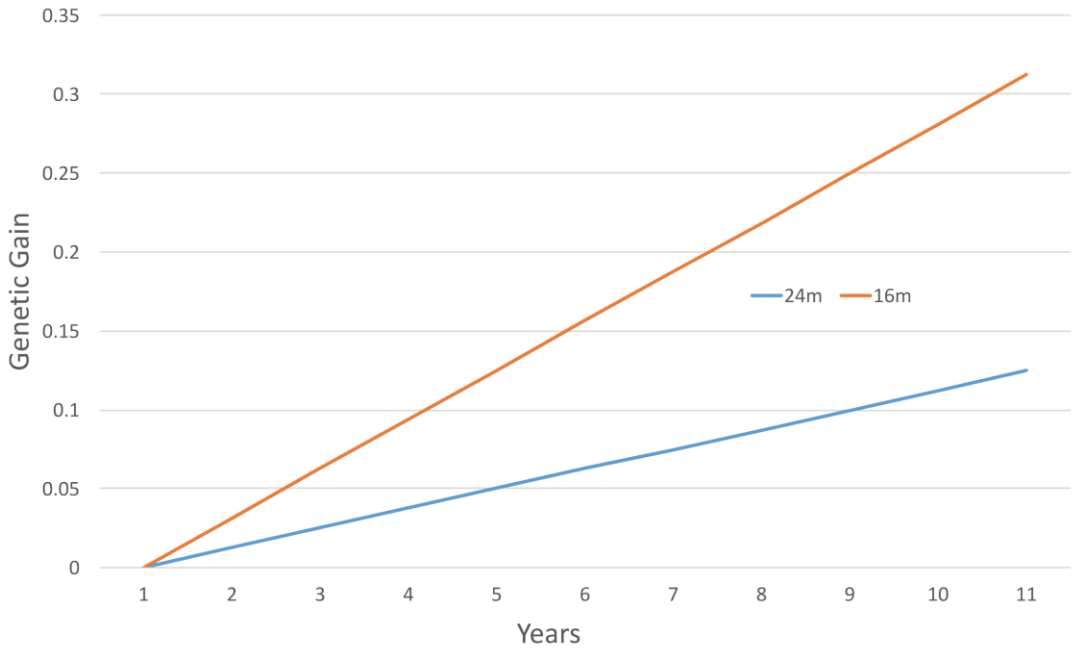
Not met any expectations – 3%

www.vetfutures.org.uk

Farm

Genetic Gain = $\frac{\text{Heritability x Phenotypic Variability x Selection Intensity}}{\text{Genetic Interval}}$

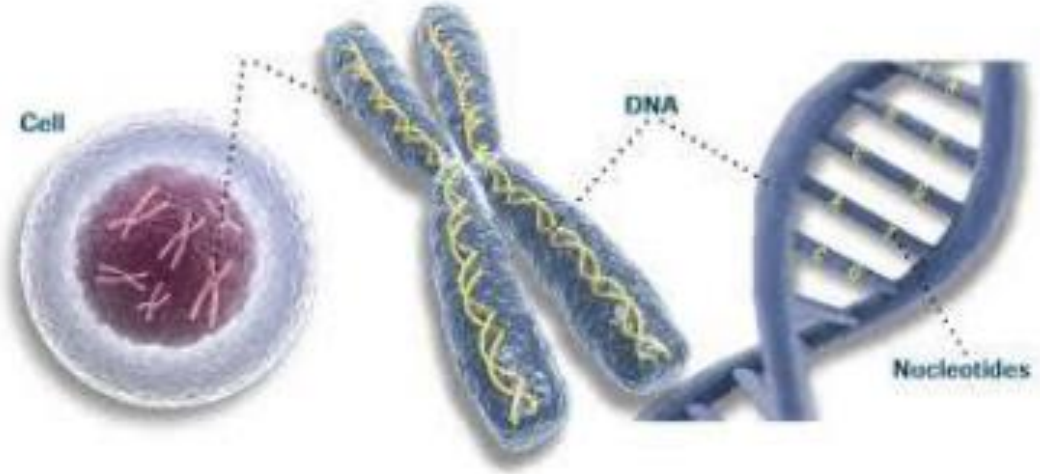




What is genomics?

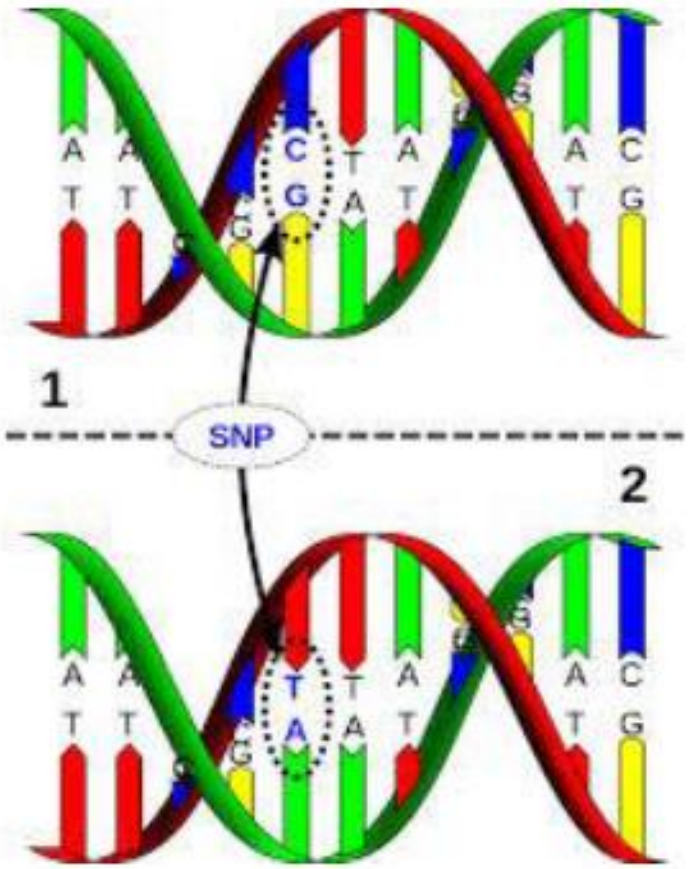
- Study and evaluation of genes to predict the performance of animals and their offspring.

- Availability of bovine genome – 2009



- 30 chromosome pairs
- 22,000 genes
- 3 billion base pairs

Genomics - SNP's (SNIPS)



- **Most common type of genetic variation**
- **Each SNP represents a difference in a single DNA building block.**
- **Information from certain SNP's important;**
  - Locate genes of interest.
  - Or alter gene function themselves.

Prediction of animals genetic merit

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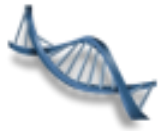
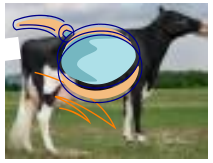
Reliability increases confidence in our breeding decisions

True Breeding Value—not achievable

Reliability

Genome-Enhanced PTAs: ~68-70 NM Rel (Hol)





Pedigree Selection: 25 (0 – 30) NM Rel; assumes perfect parentage

Visual Selection: Very Low Rel; Mgmt? Traits?

Random Selection: 0% Rel

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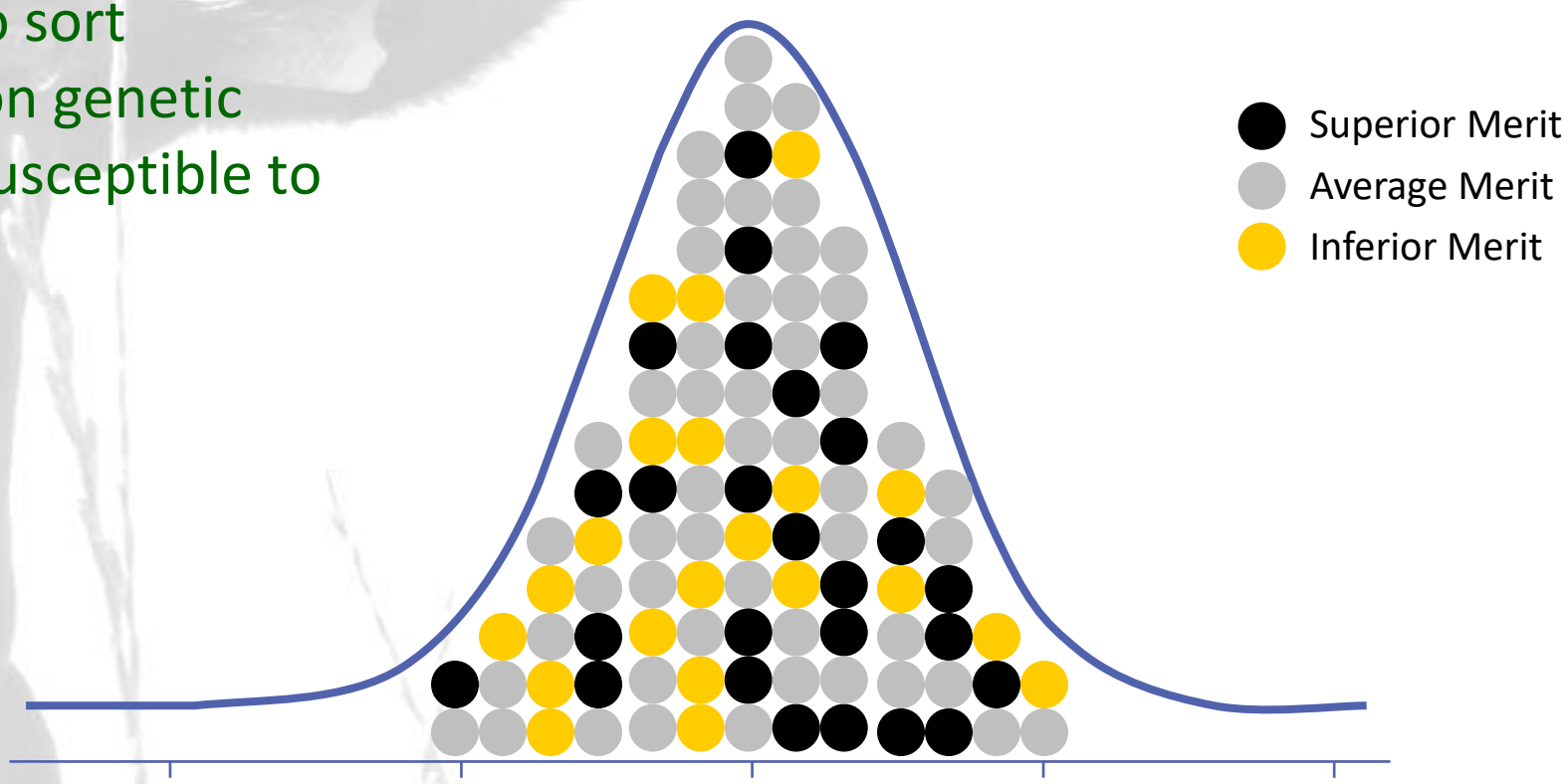
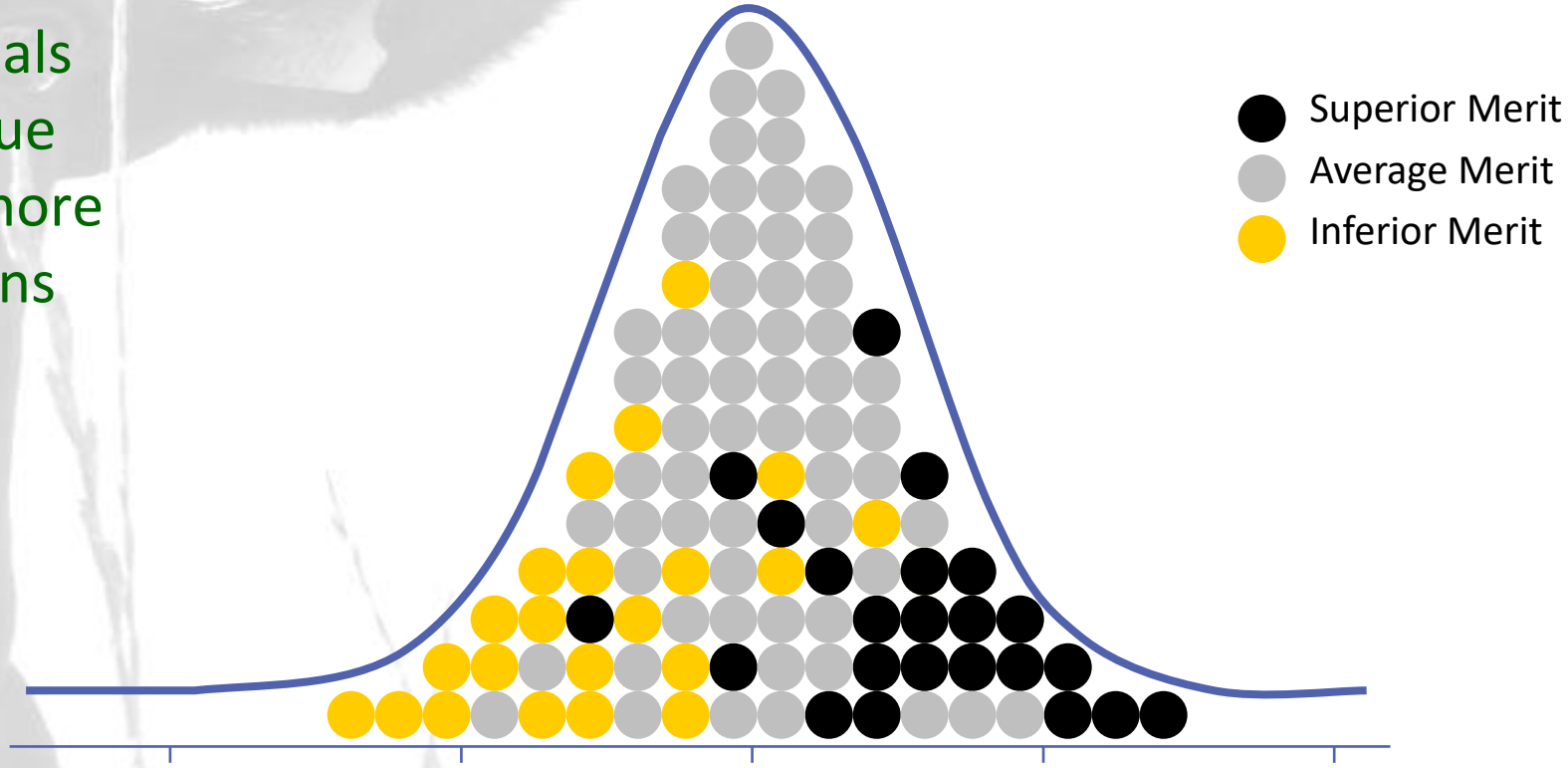
When Reliability = Parent Average

We can begin to sort animals based on genetic merit, but are susceptible to mistakes

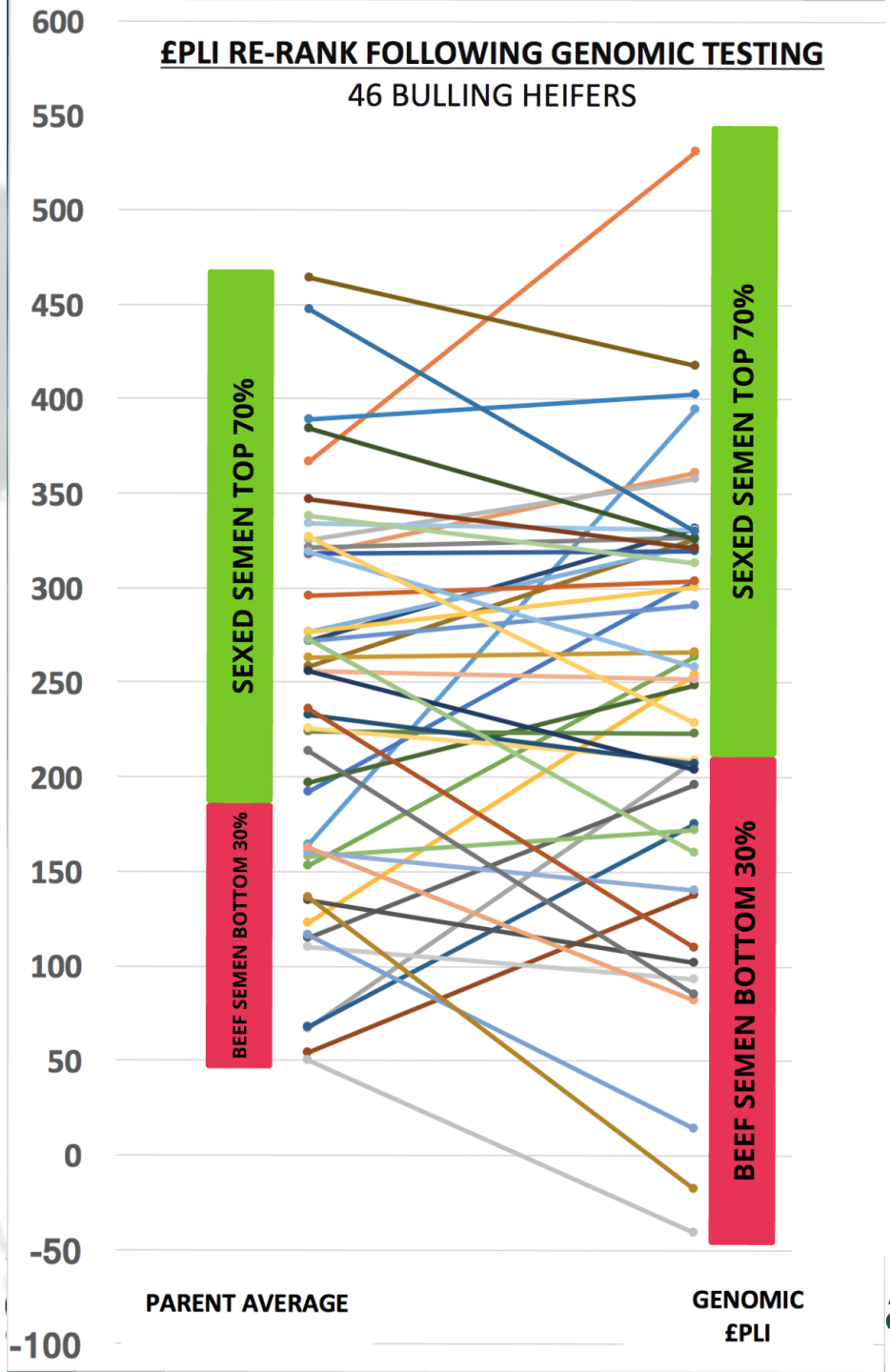


With Genomic Reliabilities

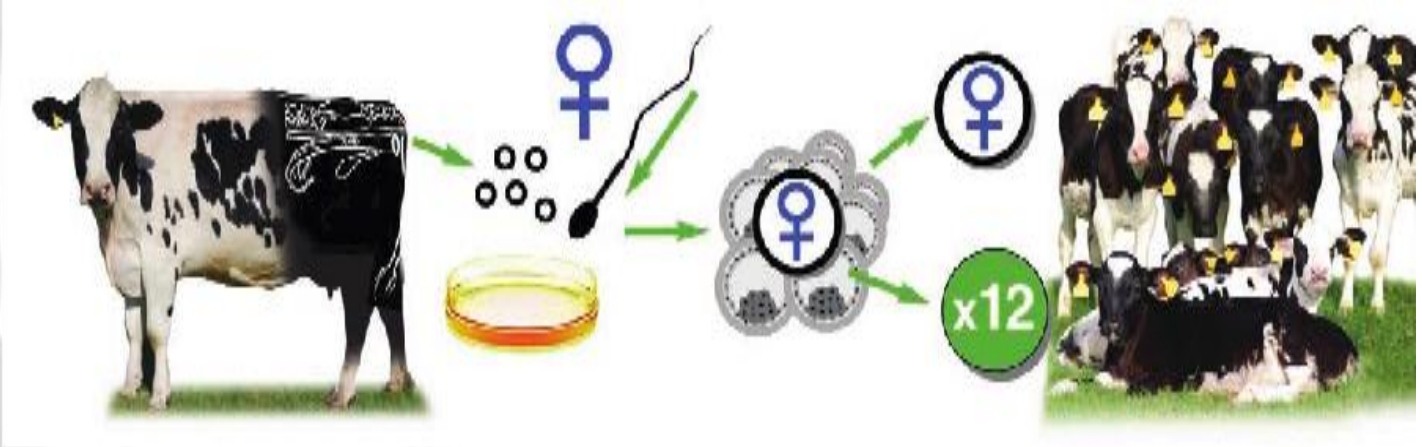
High reliability predictions help to sort animals based on their true genetic merit = more accurate selections



Practical Use



Advanced Breeding - Activf-ET



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VetSalus

Vet Sustain

XL Vets Farm

Activf-ET In Vitro Fertilisation (IVF)

Specialising in IVF Technologies to accelerate genetic progress

Activf-ET IVF process using your own cows as donors

Simple Process

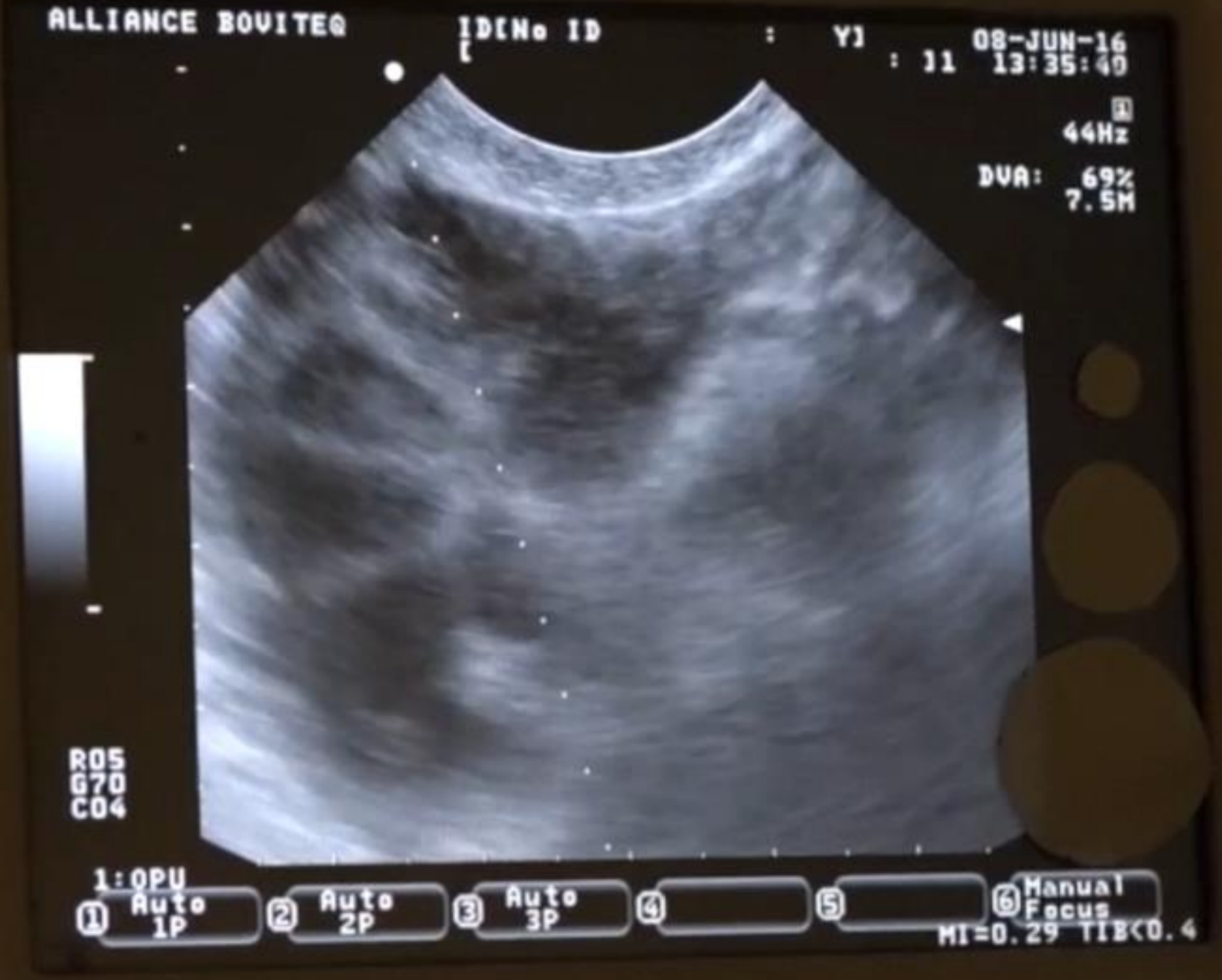
- Donors selected
- Donors super-ovulated
- Oocytes harvested by your vet trained by Activf-ET
- Oocytes couriered overnight to Activf-ET lab
- Oocytes fertilized to create embryos; embryos incubated for 6-7 days
- Client preps recipients
- Embryos shipped to client for 'fresh' implant w/in 24 hours or frozen for future use

Activf-ET

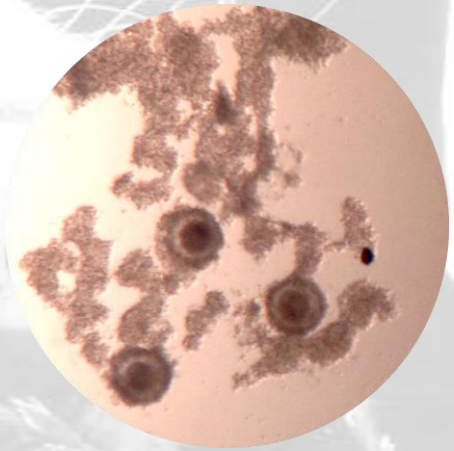
In partnership with Boviteq INNOVATIVE IVF SOLUTIONS

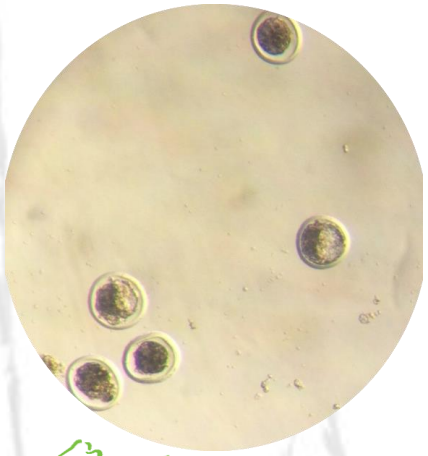
Benefits of IVF

- Faster genetic progress
- Fertilise multiple donors' oocytes with a single unit of semen
- 7 — Can work with heifers at 7 mths
- 1 — Oocytes can be collected during first third of pregnancy
- More calves/ donor/year
- 2 — Can collect every 2 weeks
- Frozen IVF embryos show higher conception % during heat stress periods
- Genetic recovery from voluntary cull animals


ALLIANCE BOVITEQ
ID[No ID : Y]
[: 11
08-JUN-16
13:35:40
44Hz
DVA: 69%
7.5M
R05
G70
C04
1:OPU
1 Auto 1P
2 Auto 2P
3 Auto 3P
4
5
6 Manual Focus
MI=0.29 TIB<0.4

IVF Lab





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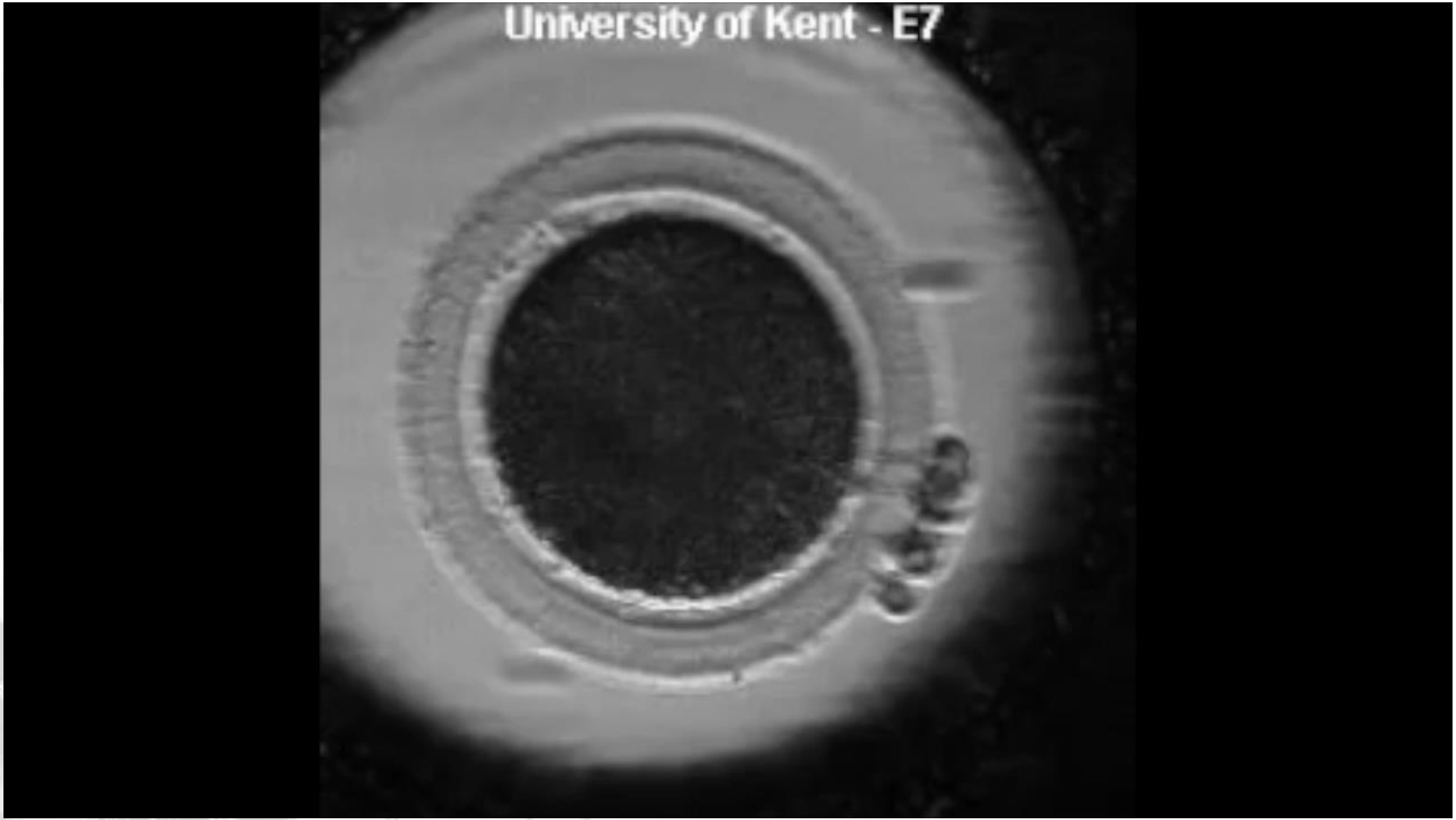
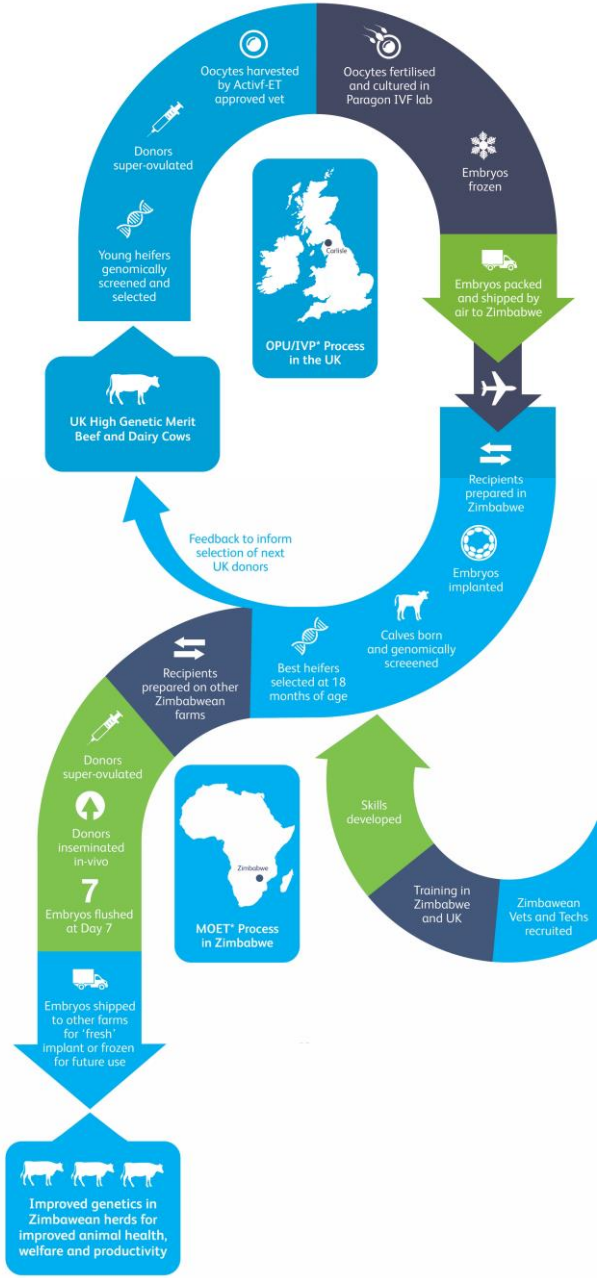

University of Kent - E7

Genetic Improvement of Cattle in Zimbabwe Utilising Advanced Breeding Technologies



The "Funnel and Cascade" Innovation

By combining and utilising the latest cattle genomic and breeding technologies we can efficiently select from a large untapped reserve of UK cattle genetics identifying desirable traits.

By efficiently producing OPU/IVF embryos we can "funnel" the genetic improvement and send it to Zimbabwe where we can then amplify these traits locally, thereby creating a "cascade" of benefits.

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The Opportunity in Developing Countries

Who Benefits?

- Zimbabwe plc
- Zimbabwean Partners
- United Kingdom plc
- The population of Zimbabwe
- Women in Zimbabwe
- Cattle in Zimbabwe

A Sustainable Solution

- Improved cattle genetics
- Trained and Supported Vets and Techs
- Nutritious, healthy and safe food
- Improved income for farmers and smallholders
- Healthy animals are more efficient, have less environmental impact and require fewer antibiotics

Future Opportunities

- Refine the technologies to maximise the genetic improvements
- Develop a toolkit to roll this technology into other developing countries
- Refine the genomic selections – including more complex health and sustainability traits to suit African conditions

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Embryo Biopsy

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The Future of Farming needs A Healthy Industry which needs Healthy Animals

Attitude is Everything – by Bonnie Mohr

Farm


Gracias, Dank,
Merci, Thank you