



Zimbabwe Herd Book

in collaboration with



proudly brings you

BEEF SCHOOL 2026

15th & 16th September

Zimbabwe Herd Book
Beef School 2026 - 15th & 16th September
**"Beefing up skills –
raising the 'steaks' with adapted cattle"**

Tuesday 15th September

07:00 - 07:30	Registration
07:30 - 07:40	Welcome
07:40 - 07:45	Sponsor Slot
07:45 - 08:35	Selection In Practice Using BREEDPLAN - Dr Fiona Macarthur
08:35 - 09:25	Fetal Programming: Investing In the Future - Willem Augustyn
09:25 - 09:55	Break
09:55 - 10:00	Sponsor Slot
10:00 - 10:50	Animal Health Update - Dr Pious Makaya
10:50 - 11:40	No Profit Without Adaptable Cattle - Pikkie Uys
11:40 - 13:10	Lunch
13:10 - 13:15	Sponsor Slot
13:15 - 13:45	A Global Perspective on Profitable Livestock Production (Challenges and Opportunities) - PJ Budler
13:45 - 14:45	Year of the Boran - PJ Budler & Pikkie Uys
14:45 - 15:35	Meat Protein Market Assessment - Dr Reneth Mano
15:35 - 16:05	Break
16:05 - 16:10	Sponsor Slot
16:10 - 17:00	Bridging The Gap: Using Alternative and Natural Remedies Alongside Standard Veterinary Medicines to Keep Livestock Healthy - Prof Jan Myburgh
17:00 - 17:50	How Not to Save Yourself Broke on A Beef Farm - Dennis Tsondayi
17:50 - 18:00	Cash Bar
18:00 - 19:00	Modern Stud Breeding Trends - PJ Budler
19:00	Dinner

Zimbabwe Herd Book
Beef School 2026 - 15th & 16th September
**"Beefing up skills –
raising the 'steaks' with adapted cattle"**

Wednesday 16th September

07:00 - 07:30	Opening
07:30 - 07:35	Sponsor Slot
07:35 - 08:25	Harnessing Africa's Cattle Potential - Dr Doug Bruce
08:25 - 09:15	Winter Supplemental Strategies to Optimize Body Condition and Reproduction in Beef Breeding Animals - Dr Hinner Köster
09:15 - 09:45	Break
09:45 - 09:50	Sponsor Slot
09:50 - 10:40	Raw Materials and Feed Trends - Dr Chrispen Sukume
10:40 - 11:30	Budgeting The Way A Cattleman Thinks - Rowan Hayter
11:30 - 13:00	Lunch
13:00 - 13:05	Sponsor Slot
13:05 - 13:55	Practical Knapsacks and Spray Races - Lozino / Red Dane Agri Solutions
13:55 - 14:45	Electric Fencing and Handling Facilities - Nemtech
14:45 - 15:35	Fixed Time AI - Anne Cooke
15:35 - 16:05	Break
16:05 - 16:10	Sponsor Slot
16:10 - 17:00	Home Mixing of Feed: Taking Control of the Ration - Chris Cilliers
17:00 - 17:50	Labour Motivation: Build Your Best Team - Ajs Kirk
17:50 - 18:00	Cash Bar
18:00 - 18:30	ZHB Awards
18:30	Dinner

ZIMBABWE HERD BOOK

BEEF & SMALL STOCK SCHOOLS 2026

Harare

A warm welcome to all farmers, breeders, sponsors, presenters, and stakeholders.

On behalf of the Zimbabwe Herd Book, I am delighted to welcome you to our **Beef & Small Stock Schools** here in Harare.

2026 is a very special year as we celebrate **The Year of the Boran**, and **The Year of the Dorper**. We look forward to showcasing these exceptional adapted breeds and the role they play in building resilient and profitable livestock enterprises in Zimbabwe.

Over the next three days, our program features:

- **2 Days dedicated to the Beef School:** *"Beefing up skills - raising the 'steaks' with adapted cattle"*
- **1 Day dedicated to the Small Stock School:** *"Efficiency in motion - Genetics for a changing world"*

What you can expect:

1. **A special focus on the Boran and Dorper breeds** - with animals on display and expert input on their adaptation, productivity, and contribution to our industry.
2. A showcase of other adapted cattle, sheep, and goat breeds suited to Zimbabwe's environment and markets, with the opportunity to engage directly with breeders.
3. Practical presentations and discussions aimed at "beefing up skills" and improving efficiency across all enterprises.
4. The chance to network with fellow farmers, presenters, sponsors, and service providers, while visiting exhibition stands for solutions to strengthen your operations.
5. A continued focus on genetics as the key to productivity in a changing world.

I would like to take this opportunity to thank our hardworking ZHB team, our knowledgeable presenters, and all our generous sponsors for their continued support in making these schools possible.

Let us come together over these three days to learn, share, and raise the "steaks" for the future of our livestock sector.

Thank you,

Anne Cooke

Chairman - Zimbabwe Herd Book



Willem Augustyn



Dr Doug Bruce



PJ Budler



Chris Cilliers



Anne Cooke



Ajs Kirk



Dr Hinner Köster



Dr Fiona Macarthur



Prof Jan Myburgh



Dennis Tsondayi



Pikkie Uys

Willem Augustyn

- *Fetal Programming: Investing In The Future*

Originates from Sutherland in the Northern-Cape, South-Africa. I am an Animal Nutritionist with over six years of experience in the animal nutrition industry. I hold a B.Sc. and M.Sc. Agric. in Animal Nutrition from the University of the Free State. Since relocating to Zimbabwe in September 2023, I have served as the Head of Ruminant Nutrition at Fivet Animal Health, where we provide technical advice and develop practical, science-based nutritional solutions to improve livestock productivity and profitability.

Dr Doug Bruce

- *Harnessing Africa's Cattle Potential*

A Zimbabwean veterinarian trained at Onderstepoort Veterinary Faculty of Pretoria University in South Africa. He has experience in large animal practice, large scale intensive pig production and has dabbled in ostrich and crocodile production. He has worked in the animal health industry, the corporate world and in practice - always serving farmers and their animals. His main objective is to improve the efficiency of local producers and make them internationally competitive.

PJ Budler

- *A Global Perspective on Profitable Livestock Production (Challenges and Opportunities)*
- *Modern Stud Breeding Trends*

PJ Budler was raised on a 5th generation cattle operation in South Africa. At age 15 he founded BonHaven Beef Cattle. Between 1996 and 2012 he grew BonHaven to 5 locations in 3 different countries. The Hereford, Angus, Red Angus, Braford and Brahman herds achieved much success winning numerous National Shows and setting auction records on the continent.

In 2012, PJ relocated to Texas, USA, where he is the International Business Manager for Trans Ova Genetics. This position, together with running the annual "Champion of the World" Competition, judging shows, speaking at events and cattle industry consulting has taken him to 49 US states and 128 different countries thus far.

He has judged 109 different cattle breeds in 54 countries. In 2017 PJ became the first to ever judge a National Show on all 6 continents.

Chris Cilliers

- *Home Mixing of Feed: Taking Control of the Ration*

Studied at the University of Pretoria BSc Agric animal Science. After study worked for small feed company close to the Vaal dam in the high veld area in SA. After this worked for AFGRI Animal feeds as Technical Ruminant advisor for 3 years in the high veld area. Worked closely with Konsortium Merinos as well. Started to work at Trouw nutrition as Beef nutritionist. Have a big passion for Beef cattle and all that goes with it, from on farm formulation to the sustainable practices of beef farming.

Anne Cooke

- *Fixed Time AI*

With 30 years of experience breeding pedigree cattle, she serves as Chairman of the Zimbabwe Herd Book (ZHB) and Chairman of the Tuli Cattle Federation of Southern Africa (TCFSA). Anne is also a dedicated committee member of the Zimbabwe Beef Producers Society (ZBPS) and the Zimbabwe Tuli Society, championing excellence in cattle breeding and beef production.

She is a qualified nurse by trade and proud mother of three. A passionate cattle farmer she runs a herd of 350 pedigree tulus and is a consultant to other pedigree breeders

Rowan Hayter

- *Budgeting The Way A Cattleman Thinks*

Ajs Kirk

- *Labour Motivation: Build Your Best Team*

Born 1971 in Denmark and came to Zimbabwe in 1973. Has a diploma from Blackfordby Agricultural College. Ajs is married with 2 children.

He is a dairy farmer and is involved in the following companies Red Dane farming, Ice Feed and Kefalos. Currently milking 1,250 dairy cows in three dairies. Has a Tuli beef herd of 400, cropping maize, potatoes and pastures. Red Dane Agri Solutions has three outlets supplying a range of products to the livestock industry.

Icefeed: Making a range of finished feeds and agents for Trouw nutrition supplying their premixes, and Kefalos: Cheese products and Zimbabwe's premier dairy processor.

Dr Hinner Köster

- *Winter Supplemental Strategies to Optimize Body Condition and Reproduction in Beef Breeding Animals*

Dr Hinner Köster started his studies in 1983 and holds a B.Sc. Agric, B.Sc. Agric. (Hons.), and M.Sc. Agric. (Animal Nutrition) from the University of Pretoria. In 1995 he completed his Ph.D. in Ruminant Nutrition at Kansas State University, USA where he remains an adjunct faculty Professor since 2008.

He is a globally recognized expert in animal science and livestock nutrition. His groundbreaking research on protein supplementation is widely cited and has revolutionized the livestock feed supplement market in South Africa and beyond.

Dr Köster still contributes to academic education of Animal Scientists at various Universities as co-supervisor for post graduate students as well as external examiner and guest lecturer. He has over 40 international and national scientific papers and abstracts and has published more than 600 popular scientific and popular press papers. He has presented more than 25 papers at international conferences and symposia and addressed over 600 commercial farmers' and information days in various parts of the world. He is a member of the American Society of Animal Science, South African

Society of Animal Science where he served on Council until 2012, and South African Council for Natural Scientific Professions.

He played a major role since 1998 at the SA Animal Feed Manufacturers Association, also as past Chairman. During his term as Chairman, he was instrumental in initiating and contributing to the drafting of various Codes of Practice, Industry standards and a Code of Conduct for the Animal Feed industry. He is a past Chairman of the University of Pretoria's Alumni Board, past President of the SA Hereford Association and Executive member of the World Hereford Organization, and past Chairman of the SA Senior Sunshine Golf Tour. Since 2019 he serves as President of the University of Pretoria's Convocation as well as a Council member of the University of Pretoria since 2021.

He started his professional career in 1997 as Chief Nutritionist of Kynoch Feeds. Thereafter, he became Technical Director of Afgri Animal Feeds, then Managing Director of Scinetic, the Centre for Excellence within Afgri Operations (Pty) Ltd. In January 2009, he decided to focus more independently on adding value to the South African as well as global animal feed, health and production chain. At that time, he joined Animate Animal Health (Pty) Limited as a partner and Director. In May 2012, he became the CEO of the Kanhym Group, one of South Africa's largest agricultural companies at the time and functioned in this capacity until September 2013. He then reverted to consulting and numerous private business opportunities, specifically aimed at agriculture and the livestock feed production chain. Since 2023, Dr Köster is a full-time international ruminant nutrition consultant and has vested business interests as a partner in various other industries and entities. Over the past 10 years he has assisted livestock producers, global companies and organizations, international funds, and governments as an expert consultant across Africa and Asia.

Throughout his professional career he was honoured with various prestigious scientific and industry awards for his noteworthy contributions to the livestock feed industry and animal science profession.

Dr Fiona Macarthur

- *Selection In Practice Using BREEDPLAN*

Fiona completed a Bachelor of Agriculture, Bachelor of Science Hons 1 and a PhD in Ovine Production and Parasitology from the University of New England, Australia. She brings over 19 years of experience in agricultural industries, including the past ten years in ruminant extension and producer engagement. Furthermore, Fiona works with Australian Wool Innovation Extension New South Wales, assisting with the delivery of workshops and webinars. With a strong background in parasitology, Fiona's work has consistently focused on improving animal health and production outcomes. She is actively involved in several industry-funded projects that aim to enhance the welfare of ruminants while optimising farm productivity, recently assisting the Colere Group on a Meat Livestock Australia funded Buffalo Fly Project. Based in the New England region of Australia for over 25 years, Fiona is also deeply embedded in the practical realities of livestock production through her involvement in her husband's family-owned Merino and beef cattle enterprise. Her blend of scientific knowledge and hands-on experience makes her a valuable asset to ruminant producers navigating animal health, welfare, and performance challenges.

Dr Pious Makaya

- *Animal Health Update*

Dr Reneth Mano

- *Meat Protein Market Assessment*

Prof Jan Myburgh

- *Bridging The Gap: Using Alternative and Natural Remedies Alongside Standard Veterinary Medicines to Keep Livestock Healthy*

Jan Myburgh is a retired Production Animal Medicine specialist and Toxicologist dedicated to bridging the gap between conventional and complementary medicine. His special interest is the use of plant-derived compounds (phytochemicals) for the control of livestock diseases. Integrating these approaches will enhance livestock health, boost production, and improve welfare. Jan is excited to be part of the Integrative Veterinary Medicine initiative, believing it will reshape how we practice Production Animal Medicine, in future.

Dr Chrispen Sukume

- *Raw Materials and Feed Trends*

Dennis Tsondayi

- *How Not to Save Yourself Broke on A Beef Farm*

Dennis Tsondayi - is an animal nutritionist, feed technologist and agribusiness manager with 15+ years in Zimbabwe's livestock and feed industry.

He holds a BSc in Animal Science, MSc in Food and Feed Processing Systems and Technology, and is a qualified Feed Engineer with the Swiss Institute of Feed Technology.

Dennis's academic achievements, combined with his extensive industry experience, have positioned him as a respected leader in animal nutrition, feed manufacturing, and agribusiness management. Throughout his career, he has remained committed to advancing sustainable livestock production through science-based nutrition, efficient manufacturing practices, and strong partnerships with farmers and industry stakeholders.

Known for his dedication to excellence, continuous learning, and practical problem-solving, He continues to make a meaningful contribution to Zimbabwe's agricultural and feed manufacturing sectors, helping shape a more productive and sustainable future for the country's livestock industry.

Pikkie Uys

- *No Profit Without Adaptable Cattle*

Pikkie farms together with his brother Johan on the main farm Gryshoek in the eastern Highveld of Mpumalanga, where the altitude ranges from 1 350 m to 2 000 m above sea level. Johan's two sons joined the farming operation three years ago and are the sixth generation on the farm. They breed Drakensberger cattle – the oldest herd in South Africa – as well as the oldest Merino flock in the former Transvaal, and also run a flock of Afrino sheep. Pikkie has been farming for 30 years.

SELECTION IN PRACTICE using BREEDPLAN

Dr. Fiona Macarthur



BREEDPLAN[®]
Genetic Evaluation

ABRI *Innovative Agricultural Technology*



Presentation Outline

- Why Selection Matters?
- Defining your Breeding Objective
- Understanding EBVs and Accuracy
- Using Selection Indexes Effectively while balancing selection on Growth, Fertility and Carcass Traits
- Practical Bull Selection Using BREEDPLAN
- Measuring and Accelerating Genetic Change



Why Selection Matters?



BREEDPLAN[®]
Genetic Evaluation

ABRI Innovative Agricultural Technology

Accelerating genetic progress in beef cattle since 1985

What is BREEDPLAN?

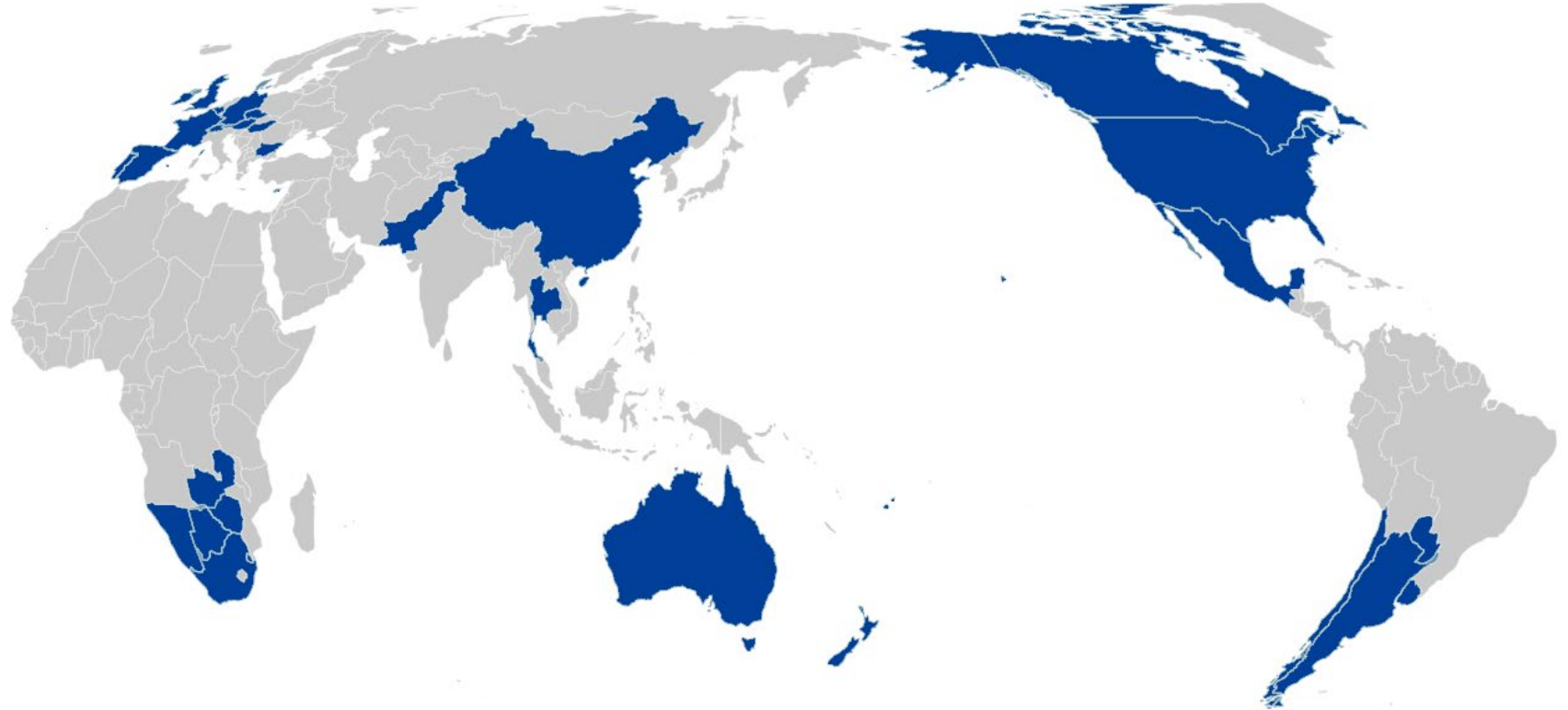
- A flexible and modern beef cattle genetic evaluation, celebrating 40 years of success
- Software developed by Animal Genetics and Breeding Unit (AGBU)
 - A joint venture of the University of New England and the NSW Department of Primary Industries and Regional Development
 - Funding support from Meat & Livestock Australia (MLA)
- Commercial delivery by Agricultural Business Research Institute (ABRI)
 - With support from international partners including the Livestock Registering Federation (LRF)



The Current BREEDPLAN World

Genetic Evaluations for:

- 80 groups based in 13 countries
 - Breed societies
 - Breeder groups
 - Pastoral companies
 - Direct-to-breeder
- Comprised of ~6000 herds in 33 countries
- With >15 million animals analysed
- ~1.2 million genotypes



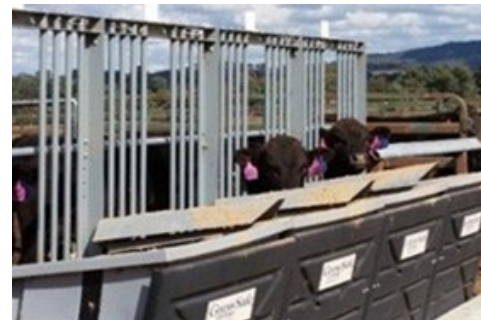
What Drives Profit and Production?

$$\text{\$} = \text{No. Calves} \times \text{Weight (kg)} \times \text{Quality (c/kg)}$$



less

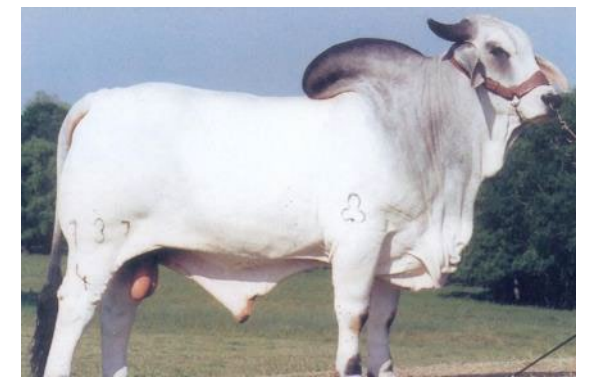
Cost of Production





There is a large amount of variation across different cattle breeds...





**And just as much
variation within
a breed...**



**The key to successful animal breeding is
the accurate description and use of this
variation**

...

to breed the next generation



BREEDPLAN[®]

Genetic Evaluation

ABRI Innovative Agricultural Technology

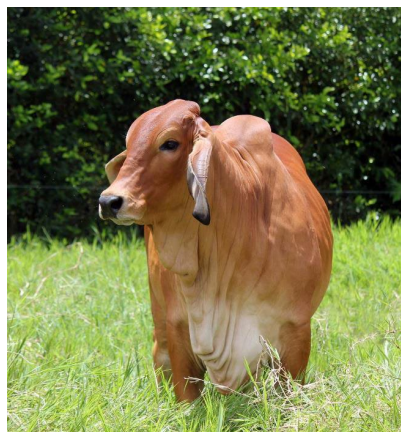
Accelerating genetic progress in beef cattle since 1985

The Problem: We cannot simply look at an animal and see it's genetic merit

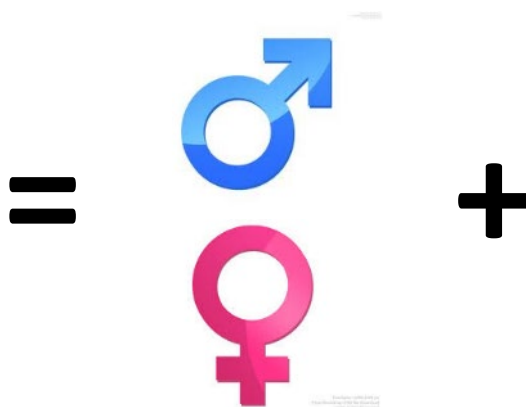


$$P = G + E$$

P = Phenotype



G = Genetics



- ½ sire and ½ dam
- Set at conception

E = Environment



- Nutrition
- Climate
- Management
- Health
- Age

**The Solution: Use BREEDPLAN to get an understanding
of the genetic merit of an individual**



BREEDPLAN[®]

Genetic Evaluation

ABRI Innovative Agricultural Technology

Accelerating genetic progress in beef cattle since 1985

BREEDPLAN Traits

BREEDPLAN produces EBVs (Estimated Breeding Values) for a range of economically important traits:

Growth	Fertility & Calving	Carcase	Other
Birth Weight 200 Day Growth 400 Day Weight 600 Day Weight Maternal (Milk) Mature Cow Weight	Scrotal Size Days to Calving Percent Normal Sperm Gestation Length Calving Ease <ul style="list-style-type: none">• Direct• Daughters	Carcase Weight Eye Muscle Area Fat Depth: <ul style="list-style-type: none">• Rump• Rib Intramuscular Fat Retail Beef Yield Shear Force	Temperament: <ul style="list-style-type: none">• Docility• Flight Time Net Feed Intake Structural Soundness

How Does BREEDPLAN Calculate EBVs?- Performance Recording

- Calculated from pedigree and performance information supplied by breeders (usually seedstock) using BREEDPLAN technology
- No 'requirement' to collect performance data for all BREEDPLAN traits



Photo courtesy Gyranda Santa Gertrudis



Photo courtesy Seifert Belmont Red



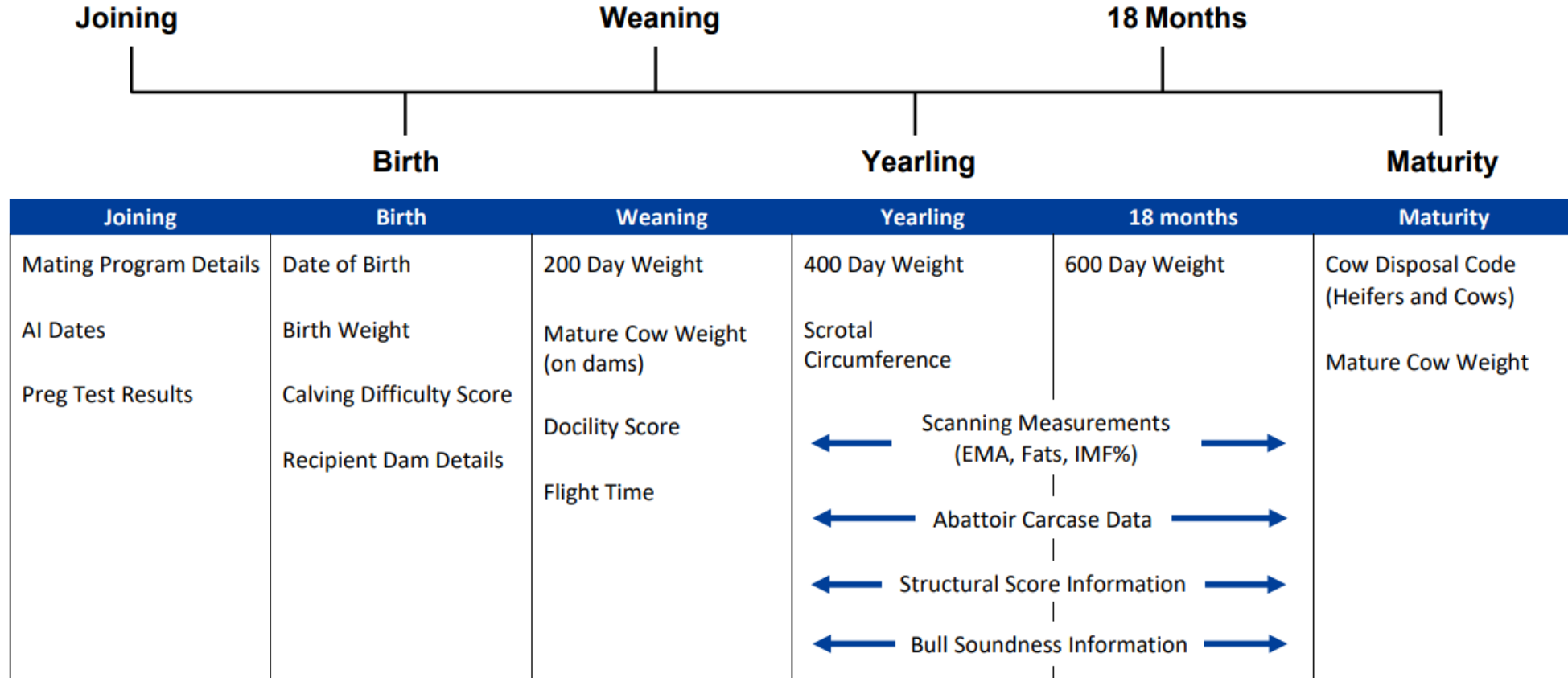
Photo courtesy Wirruna Herefords



Photo courtesy Vix Devons

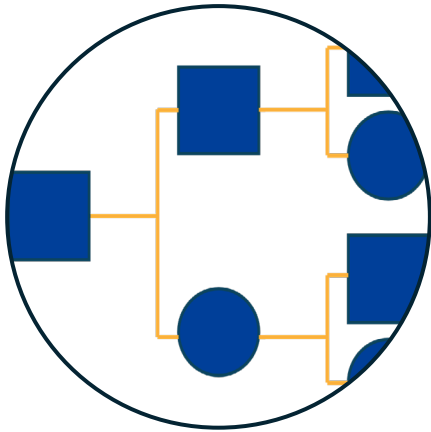
However, we strongly recommend that you consider recording all traits that are **important** to your and/or your clients' **breeding objective(s)**

BREEDPLAN Performance Recording Timeline

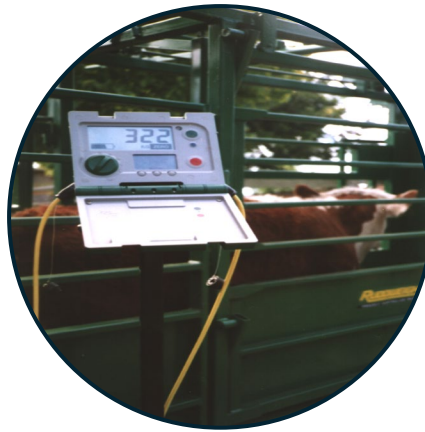


How Does BREEDPLAN Calculate EBVs?

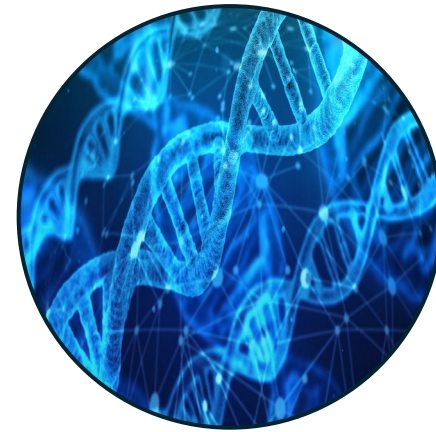
- Calculated from pedigree and performance information supplied by breeders (usually seedstock) using BREEDPLAN technology
- More recently, DNA information is being used in **some analyses** alongside pedigree and performance data to calculate EBVs (Single-Step BREEDPLAN)



+



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Single Step BREEDPLAN

- Currently 20+ Single-Step BREEDPLAN analyses, including the following in Southern Africa:

Breed	Breed Societies	Implemented
Hereford	1. Herefords Australia 2. New Zealand Hereford Association 3. Hereford Cattle Breeders Society of Namibia	October 2017
Brahman	1. Brahman Cattle Breeders' Society of Namibia 2. Brahman Cattle Breeders' Society of South Africa 3. Brahman breeders recording with Zimbabwe herd book	November 2023
Limousin	1. Australian Limousin Breeders' Society 2. Limousin Cattle Breeders Society of Namibia 3. Limousin Cattle Breeders Society of South Africa	November 2023
Simbra	1. Simbra Cattle Breeders' Society of South Africa 2. Simbra breeders recording with Zimbabwe herd book	February 2026
Simmentaler	1. Simmentaler Cattle Breeders' Society of South Africa 2. Simmentaler breeders recording with Zimbabwe herd book	February 2026

Defining your Breeding Objective



Photo: Tuli Cattle Society Zimbabwe



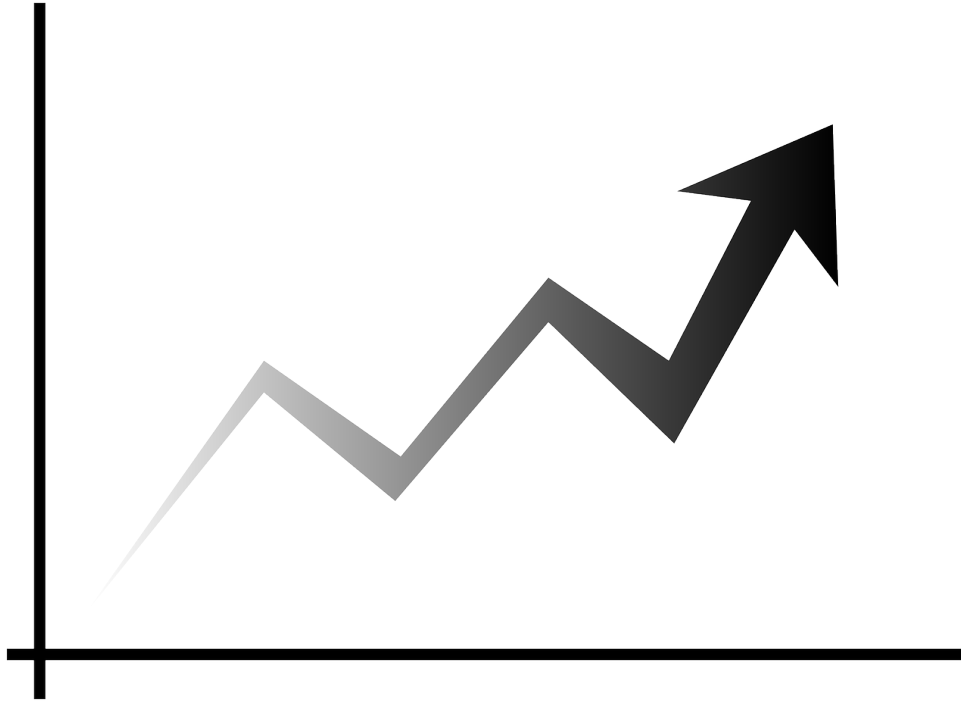
BREEDPLAN[®]

Genetic Evaluation

ABRI Innovative Agricultural Technology

Accelerating genetic progress in beef cattle since 1985

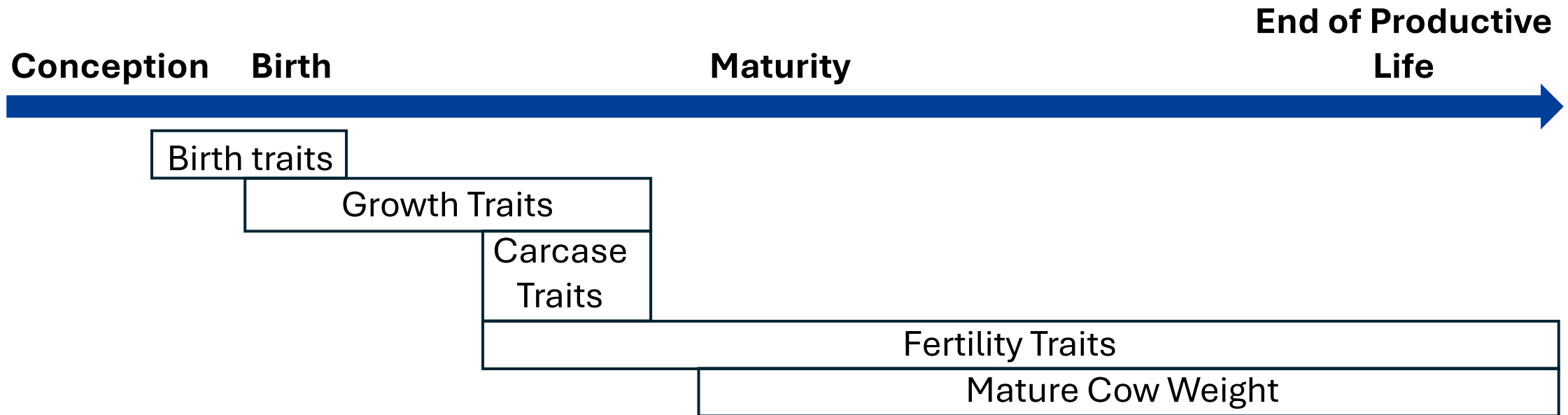
Why Breeding Objectives Are Important



Genetic evaluations like BREEDPLAN make genetic change relatively easy to achieve but genetic progress is what we desire

A Single Selection Event Will Influence Your Herd For Years

Each sire and dam has an influence on progeny for many years



And repeat for each progeny

The Right Objective For Your (or your client's) Farm(s)



Your breeding objectives should reflect:

- The existing performance and subsequent opportunities for improvement in your or your client's herd(s)

To benchmark the genetics of your herd:

- Seedstock herds - the EBVS & selection index values of individuals
- Commercial herds - the EBVs & selection indexes of your bull teams past & present

The Right Objective For Your (or your client's) Farm(s)

Your breeding objectives must also reflect your farm:

- Environment (feed availability/cost, disease prevalence)
- Management level (low/high input)
- Production system (self-replacing, terminal)
- Market end point (weight, age, carcass specs)

The above will vary from farm to farm



Breed For The Future

Traits may not be paid for today:

- Carcase quality
- Eating quality
- Feed efficiency
- Sustainability traits



Breeding ahead of the market:

- Creates market opportunity
- Reduces future risk
- Cheaper than catching up later



Breed for the Future II

For a weaner producer, are 400 or 600 Day Weight EBVs important when buying a bull?

- At first glance, no – the weaner progeny are sold before those traits are expressed
- In reality, yes - they matter to the buyers downstream, and ignoring them can harm reputation and future sales

The same applies to carcase traits



A Whole-System Approach to Selection

Number Of Calves	Weight	Quality	Cost of Production
Calving Ease Direct	Birth Weight	Carcase Weight	Calving Ease Direct
Calving Ease Daughters	200-day Weight	Eye Muscle Area	Calving Ease Daughters
Birth Weight	400-day Weight	Rib Fat	Mature Cow Weight
Scrotal Size	600-day Weight	Rump Fat	Docility
Days To Calving	Mature Cow Weight	Retail Beef Yield	Net Feed Intake
	Milk	IMF	
	Carcase Weight	Docility	
Selection Indexes			

A Whole-System Approach to Selection

Number Of Calves	Weight	Quality	Cost of Production
Calving Ease Direct	Birth Weight	Carcase Weight	Calving Ease Direct
Calving Ease Daughters	200-day Weight	Eye Muscle Area	Calving Ease Daughters
Birth Weight	400-day Weight	Rib Fat	Mature Cow Weight
Scrotal Size	600-day Weight	Rump Fat	Docility
Days To Calving	Mature Cow Weight	Retail Beef Yield	Net Feed Intake
	Milk	IMF	
	Carcase Weight	Docility	
Selection Indexes			

Note that some traits fit into more than one category and BREEDPLAN selection indexes cover all

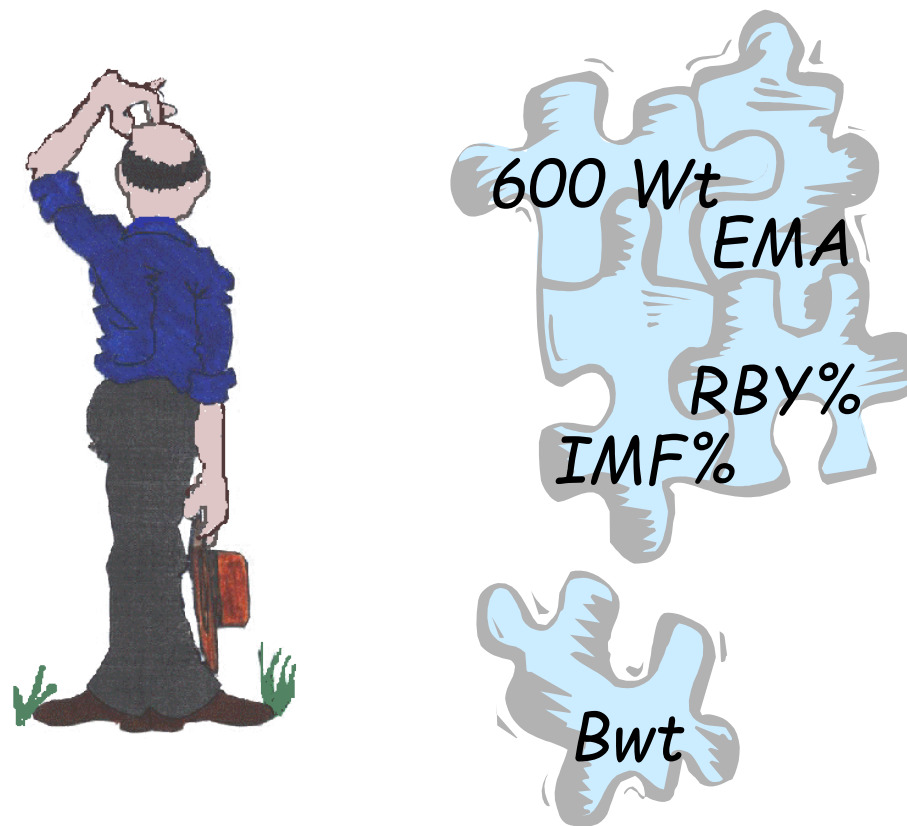
Not Just the Popular or Easy Traits

Traits often prioritised:

- Growth
- Sale weight

Other traits that can have a larger influence on profit are often neglected:

- Fertility
- Efficiency



If it is economically important, it deserves selection pressure (and recording)!

Understanding EBVs and Accuracy



BREEDPLAN[®]
Genetic Evaluation

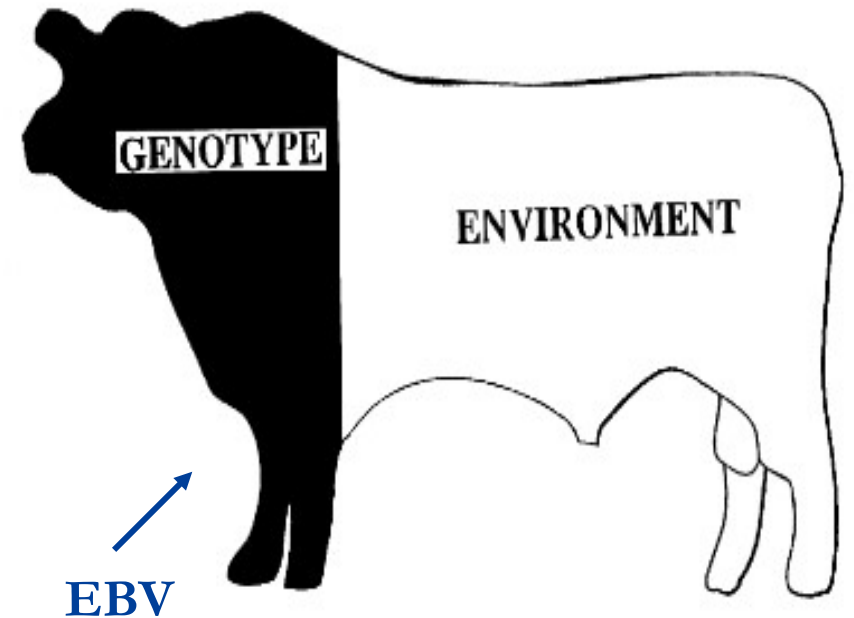
ABRI Innovative Agricultural Technology

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Why we need BREEDPLAN EBVs?

Many causes of variation in performance and appearance in beef cattle

- Age
- Farm
 - Feeding
 - Management
 - Health
 - Climate
- Genetics
 - The only thing that is passed onto to progeny





**“To select beef cattle without
BREEDPLAN is like selecting
what is for dinner from
unlabelled cans”**

**Dr David Johnson
Animal Breeding & Genetics Unit**

Comparing BREEDPLAN EBVs

- ABRI runs over 60 different BREEDPLAN analyses
- Only EBVs for animals within the **SAME BREEDPLAN ANALYSIS** can be directly compared



Interpreting BREEDPLAN EBVs

July 2026 South African Brahman Single-Step BREEDPLAN EBVs																		
	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	NFI-P	NFI-F
EBV	-3.9	0.0	+24	+45	+59	+50	+2	+2.0	-4.5	+35	+1.0	-1.4	-1.8	+1.1	-0.2	-0.5	-	-
Accuracy	83%	96%	93%	92%	91%	86%	85%	77%	35%	82%	42%	52%	52%	43%	30%	65%	-	-
Breed Avg. EBVs for 2024 Born Calves Click for Percentiles																		
EBV	-0.8	+1.8	+17	+26	+33	+35	+2	+0.8	-0.7	+18	+0.3	+0.0	+0.0	+0.0	+0.0	+0.7	-0.02	+0.00

Traits Analysed: BWT,200WT,400WT,600WT,SS

Statistics: Number of Herds: **14**, Progeny Analysed: **123**, Scan Progeny: **4**, Number of Dtrs: **32**

1. Compare to the level of genetic merit within the current population
2. Compare expected difference in progeny performance
3. Consider EBV accuracy

1. Compare to the level of genetic merit within the current population

July 2026 South African Brahman Single-Step BREEDPLAN EBVs																		
	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	NFI-P	NFI-F
EBV	-3.9	0.0	+24	+45	+59	+50	+2	+2.0	-4.5	+35	+1.0	-1.4	-1.8	+1.1	-0.2	-0.5	-	-
Accuracy	83%	96%	93%	92%	91%	86%	85%	77%	35%	82%	42%	52%	52%	43%	30%	65%	-	-
Breed Avg. EBVs for 2024 Born Calves Click for Percentiles																		
EBV	-0.8	+1.8	+17	+26	+33	+35	+2	+0.8	-0.7	+18	+0.3	+0.0	+0.0	+0.0	+0.0	+0.7	-0.02	+0.00

Traits Analysed: BWT,200WT,400WT,600WT,SS
Statistics: Number of Herds: 14, Progeny Analysed: 123, Scan Progeny: 4, Number of Dtrs: 32

Firstly, comparing each EBV against the **breed average** allows you to quickly identify whether the animal is **above or below** the average genetic level for each trait

This bull is above breed average for 400 Day Weight

1. Compare to the level of genetic merit within the current population

July 2026 South African Brahman Single-Step BREEDPLAN EBVs																		
	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	NFI-P	NFI-F
EBV	-3.9	0.0	+2.4	+45	+59	+50	+2	+2.0	-4.5	+35	+1.0	-1.4	-1.8	+1.1	-0.2	-0.5	-	-
Accuracy	83%	96%	93%	92%	91%	86%	85%	77%	35%	82%	42%	52%	52%	43%	30%	65%	-	-
Breed Avg. EBVs for 2024 Born Calves Click for Percentiles																		
EBV	-0.8	+1.8	+17	+26	+33	+35	+2	+0.8	-0.7	+18	+0.3	+0.0	+0.0	+0.0	+0.0	+0.7	-0.02	+0.00

Traits Analysed: BWT,200WT,400WT,600WT,SS
Statistics: Number of Herds: 14, Progeny Analysed: 123, Scan Progeny: 4, Number of Dtrs: 32

Firstly, comparing each EBV against the **breed average** allows you to quickly identify whether the animal is **above or below** the average genetic level for each trait

Taking this further, this bull has genetics that are 19 kg above the current breed average for growth at 400 days of age

1. Compare to the level of genetic merit within the current population

July 2026 South African Brahman Single-Step BREEDPLAN EBVs																		
	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	NFI-P	NFI-F
EBV	-3.9	0.0	+24	+45	+59	+50	+2	+2.0	-4.5	+35	+1.0	-1.4	-1.8	+1.1	-0.2	-0.5	-	-
Accuracy	83%	96%	93%	92%	91%	86%	85%	77%	35%	82%	42%	52%	52%	43%	30%	65%	-	-
Breed Avg. EBVs for 2024 Born Calves Click for Percentiles																		
EBV	-0.8	+1.8	+17	+26	+33	+35	+2	+0.8	-0.7	+18	+0.3	+0.0	+0.0	+0.0	+0.0	+0.7	-0.02	+0.00

Traits Analysed: BWT,200WT,400WT,600WT,SS
Statistics: Number of Herds: 14, Progeny Analysed: 123, Scan Progeny: 4, Number of Dtrs: 32

Secondly, comparing each EBV against the **percentiles bands** allows you to identify exactly where an animal **ranks** within the current genetic level of the population for each trait

This can be done by using either:

- The **Percentile Bands Table**
- Or the **EBV Percentile Graph**

The Percentile Bands Table

Percentile Band	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcass Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	NFI-P	NFI-F	Rangeland Grazing Index (R)	Wean Index (R)	Feedlot Index (R)
Top Value	-5.8	-3.1	+37	+56	+82	+98	+13	+3.8	-9.0	+36	+2.9	+2.5	+3.0	+1.3	+0.4	+23.7	-0.70	-0.90	+490	+416	+308
Top 1%	-2.7	-0.6	+21	+44	+59	+63	+7	+2.1	-4.5	+29	+1.5	+1.1	+1.3	+0.6	+0.2	+8.2	-0.20	-0.30	+302	+298	+220
Top 5%	-2.0	+0.3	+25	+38	+50	+54	+6	+1.6	-3.2	+26	+1.2	+0.7	+0.7	+0.5	+0.1	+4.4	-0.10	-0.20	+232	+247	+179
Top 10%	-1.7	+0.7	+23	+35	+46	+50	+5	+1.4	-2.6	+24	+1.0	+0.5	+0.5	+0.4	+0.1	+3.0	-0.10	-0.20	+198	+221	+157
Top 15%	-1.5	+1.0	+22	+33	+43	+47	+4	+1.2	-2.2	+23	+0.8	+0.4	+0.4	+0.3	+0.0	+2.2	-0.10	-0.10	+175	+203	+143
Top 20%	-1.3	+1.2	+21	+32	+41	+44	+4	+1.1	-1.9	+22	+0.7	+0.3	+0.3	+0.2	+0.0	+1.7	-0.10	-0.10	+158	+189	+133
Top 25%	-1.2	+1.3	+20	+31	+39	+43	+4	+1.1	-1.7	+21	+0.6	+0.2	+0.3	+0.2	+0.0	+1.3	-0.10	-0.10	+143	+178	+124
Top 30%	-1.1	+1.4	+19	+30	+38	+41	+3	+1.0	-1.5	+20	+0.6	+0.2	+0.2	+0.2	+0.0	+1.0	-0.10	-0.10	+131	+168	+115
Top 35%	-1.0	+1.5	+19	+29	+36	+39	+3	+0.9	-1.3	+20	+0.5	+0.1	+0.2	+0.1	+0.0	+0.8	-0.10	+0.00	+120	+159	+108
Top 40%	-0.9	+1.6	+18	+28	+35	+38	+3	+0.9	-1.1	+19	+0.4	+0.1	+0.1	+0.1	+0.0	+0.6	+0.00	+0.00	+109	+151	+101
Top 45%	-0.9	+1.7	+18	+27	+34	+37	+3	+0.8	-0.9	+19	+0.4	+0.1	+0.1	+0.1	+0.0	+0.4	+0.00	+0.00	+99	+142	+94
Top 50%	-0.8	+1.8	+17	+26	+33	+35	+2	+0.8	-0.7	+18	+0.3	+0.0	+0.0	+0.0	+0.0	+0.3	+0.00	+0.00	+90	+135	+87
Top 55%	-0.7	+1.9	+17	+26	+32	+34	+2	+0.7	-0.6	+18	+0.2	+0.0	+0.0	+0.0	+0.0	+0.1	+0.00	+0.00	+81	+127	+81
Top 60%	-0.6	+2.0	+16	+25	+30	+32	+2	+0.7	-0.4	+17	+0.2	-0.1	-0.1	+0.0	-0.1	-0.1	+0.00	+0.00	+71	+119	+74
Top 65%	-0.5	+2.1	+15	+24	+29	+31	+2	+0.6	-0.2	+17	+0.1	-0.1	-0.1	+0.0	-0.1	-0.2	+0.00	+0.10	+61	+111	+67
Top 70%	-0.4	+2.2	+15	+23	+28	+29	+2	+0.6	+0.0	+16	+0.0	-0.2	-0.2	-0.1	-0.1	-0.4	+0.00	+0.10	+50	+102	+59
Top 75%	-0.3	+2.3	+14	+22	+26	+28	+1	+0.5	+0.3	+15	+0.0	-0.2	-0.3	-0.2	-0.1	-0.6	+0.00	+0.10	+38	+93	+50
Top 80%	-0.2	+2.4	+13	+21	+25	+26	+1	+0.4	+0.6	+15	-0.1	-0.3	-0.3	-0.2	-0.1	-0.8	+0.00	+0.10	+25	+83	+41
Top 85%	-0.1	+2.6	+12	+19	+23	+23	+1	+0.4	+0.9	+14	-0.2	-0.4	-0.4	-0.2	-0.1	-1.1	+0.10	+0.10	+9	+70	+28
Top 90%	+0.1	+2.8	+11	+18	+21	+20	+0	+0.3	+1.5	+13	-0.4	-0.5	-0.6	-0.3	-0.1	-1.4	+0.10	+0.10	-14	+55	+11
Top 95%	+0.3	+3.1	+8	+15	+17	+16	-1	+0.1	+2.2	+11	-0.6	-0.6	-0.8	-0.4	-0.2	-1.8	+0.10	+0.10	-51	+33	-15
Top 99%	+0.9	+3.8	+4	+9	+8	+5	-2	-0.3	+3.6	+8	-0.9	-0.9	-1.1	-0.6	-0.2	-2.2	+0.10	+0.20	-115	-14	-64
Low Value	+2.5	+5.3	-7	-6	-10	-25	-5	-2.2	+7.5	+2	-2.0	-2.4	-2.8	-1.6	-0.4	-2.4	+0.40	+0.50	-309	-223	-172

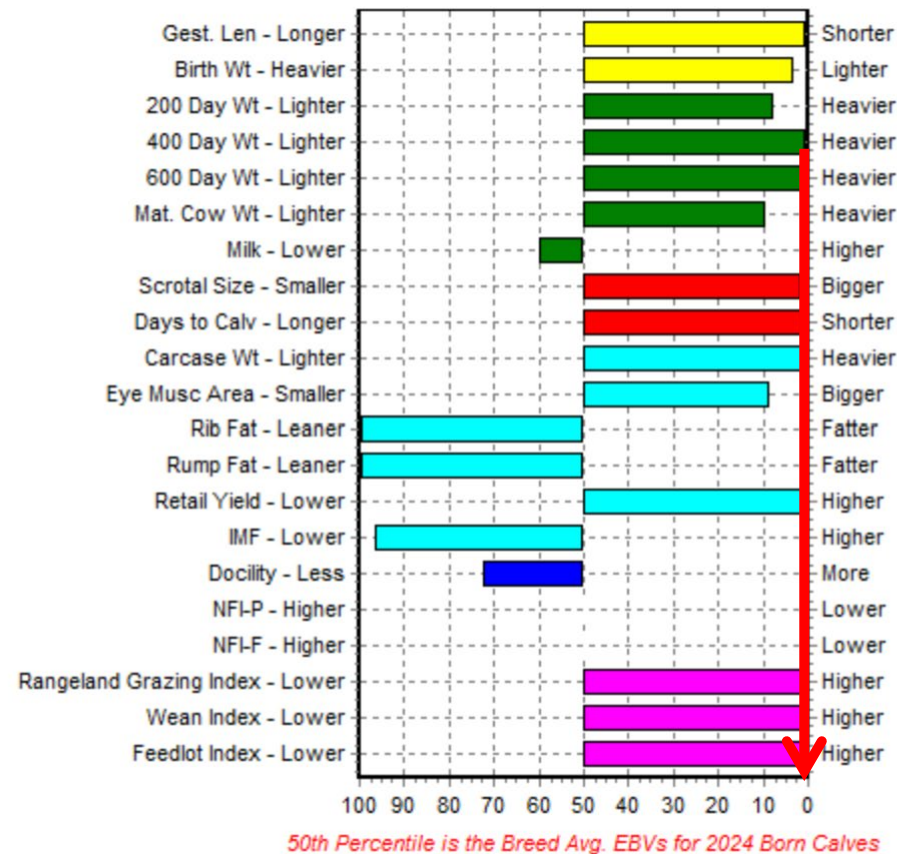
Our example bull had a 400 Day Weight EBV of +45

The Percentile Bands Table

Percentile Band	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcass Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	NFI-P	NFI-F	Rangeland Grazing Index (R)	Wean Index (R)	Feedlot Index (R)
Top Value	-5.8	-3.1	+37	+56	+82	+98	+13	+3.8	-9.0	+36	+2.9	+2.5	+3.0	+1.3	+0.4	+23.7	-0.70	-0.90	+490	+416	+308
Top 1%	-2.7	-0.6	+21	+44	+59	+63	+7	+2.1	-4.5	+29	+1.5	+1.1	+1.3	+0.6	+0.2	+8.2	-0.20	-0.30	+302	+298	+220
Top 5%	-2.0	+0.3	+25	+38	+50	+54	+6	+1.6	-3.2	+26	+1.2	+0.7	+0.7	+0.5	+0.1	+4.4	-0.10	-0.20	+232	+247	+179
Top 10%	-1.7	+0.7	+23	+35	+46	+50	+5	+1.4	-2.6	+24	+1.0	+0.5	+0.5	+0.4	+0.1	+3.0	-0.10	-0.20	+198	+221	+157
Top 15%	-1.5	+1.0	+22	+33	+43	+47	+4	+1.2	-2.2	+23	+0.8	+0.4	+0.4	+0.3	+0.0	+2.2	-0.10	-0.10	+175	+203	+143
Top 20%	-1.3	+1.2	+21	+32	+41	+44	+4	+1.1	-1.9	+22	+0.7	+0.3	+0.3	+0.2	+0.0	+1.7	-0.10	-0.10	+158	+189	+133
Top 25%	-1.2	+1.3	+20	+31	+39	+43	+4	+1.1	-1.7	+21	+0.6	+0.2	+0.3	+0.2	+0.0	+1.3	-0.10	-0.10	+143	+178	+124
Top 30%	-1.1	+1.4	+19	+30	+38	+41	+3	+1.0	-1.5	+20	+0.6	+0.2	+0.2	+0.2	+0.0	+1.0	-0.10	-0.10	+131	+168	+115
Top 35%	-1.0	+1.5	+19	+29	+36	+39	+3	+0.9	-1.3	+20	+0.5	+0.1	+0.2	+0.1	+0.0	+0.8	-0.10	+0.00	+120	+159	+108
Top 40%	-0.9	+1.6	+18	+28	+35	+38	+3	+0.9	-1.1	+19	+0.4	+0.1	+0.1	+0.1	+0.0	+0.6	+0.00	+0.00	+109	+151	+101
Top 45%	-0.9	+1.7	+18	+27	+34	+37	+3	+0.8	-0.9	+19	+0.4	+0.1	+0.1	+0.1	+0.0	+0.4	+0.00	+0.00	+99	+142	+94
Top 50%	-0.8	+1.8	+17	+26	+33	+35	+2	+0.8	-0.7	+18	+0.3	+0.0	+0.0	+0.0	+0.0	+0.3	+0.00	+0.00	+90	+135	+87
Top 55%	-0.7	+1.9	+17	+26	+32	+34	+2	+0.7	-0.6	+18	+0.2	+0.0	+0.0	+0.0	+0.0	+0.1	+0.00	+0.00	+81	+127	+81
Top 60%	-0.6	+2.0	+16	+25	+30	+32	+2	+0.7	-0.4	+17	+0.2	-0.1	-0.1	+0.0	-0.1	-0.1	+0.00	+0.00	+71	+119	+74
Top 65%	-0.5	+2.1	+15	+24	+29	+31	+2	+0.6	-0.2	+17	+0.1	-0.1	-0.1	+0.0	-0.1	-0.2	+0.00	+0.10	+61	+111	+67
Top 70%	-0.4	+2.2	+15	+23	+28	+29	+2	+0.6	+0.0	+16	+0.0	-0.2	-0.2	-0.1	-0.1	-0.4	+0.00	+0.10	+50	+102	+59
Top 75%	-0.3	+2.3	+14	+22	+26	+28	+1	+0.5	+0.3	+15	+0.0	-0.2	-0.3	-0.2	-0.1	-0.6	+0.00	+0.10	+38	+93	+50
Top 80%	-0.2	+2.4	+13	+21	+25	+26	+1	+0.4	+0.6	+15	-0.1	-0.3	-0.3	-0.2	-0.1	-0.8	+0.00	+0.10	+25	+83	+41
Top 85%	-0.1	+2.6	+12	+19	+23	+23	+1	+0.4	+0.9	+14	-0.2	-0.4	-0.4	-0.2	-0.1	-1.1	+0.10	+0.10	+9	+70	+28
Top 90%	+0.1	+2.8	+11	+18	+21	+20	+0	+0.3	+1.5	+13	-0.4	-0.5	-0.6	-0.3	-0.1	-1.4	+0.10	+0.10	-14	+55	+11
Top 95%	+0.3	+3.1	+8	+15	+17	+16	-1	+0.1	+2.2	+11	-0.6	-0.6	-0.8	-0.4	-0.2	-1.8	+0.10	+0.10	-51	+33	-15
Top 99%	+0.9	+3.8	+4	+9	+8	+5	-2	-0.3	+3.6	+8	-0.9	-0.9	-1.1	-0.6	-0.2	-2.2	+0.10	+0.20	-115	-14	-64
Low Value	+2.5	+5.3	-7	-6	-10	-25	-5	-2.2	+7.5	+2	-2.0	-2.4	-2.8	-1.6	-0.4	-2.4	+0.40	+0.50	-309	-223	-172

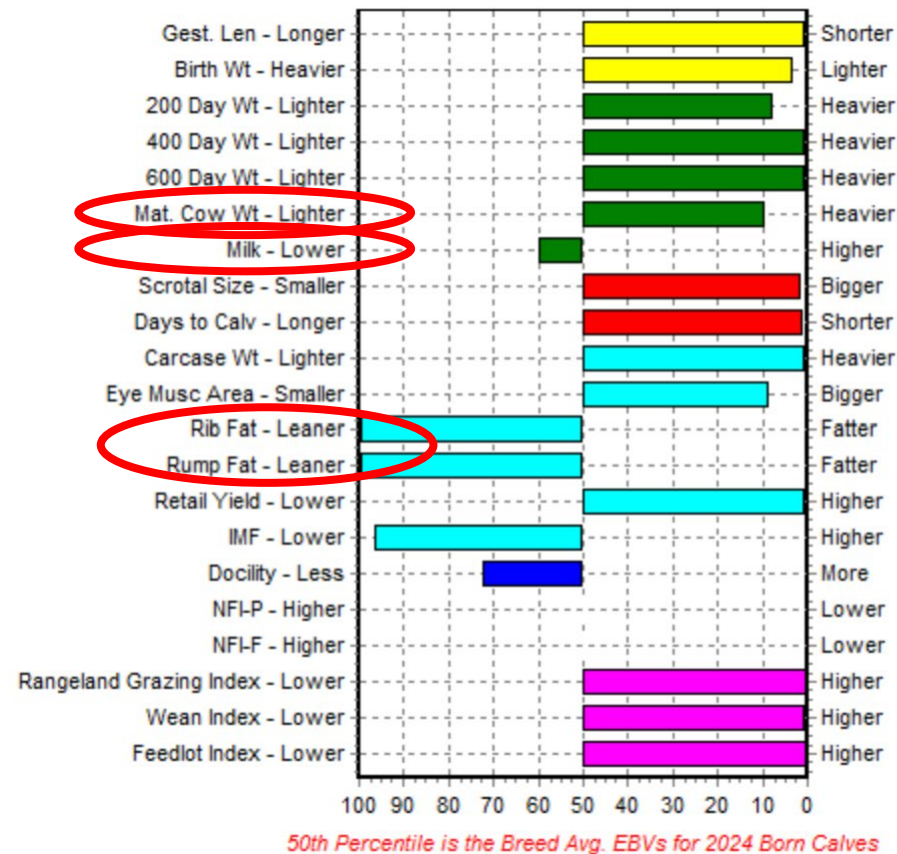
This bull ranks in the Top 1% of the population for growth at 400 days of age

The EBV Percentile Graph



This bull ranks in the Top 1% of the population for growth at 400 days of age

The EBV Percentile Graph



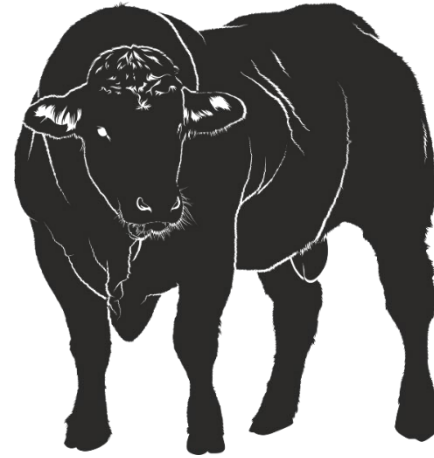
Note: It is not always optimal to be on the right-hand side of the graph for all traits!

2. Compare expected difference in progeny performance

Comparing the expected difference in progeny performance gives us an understanding of what the EBVs mean in **real terms**

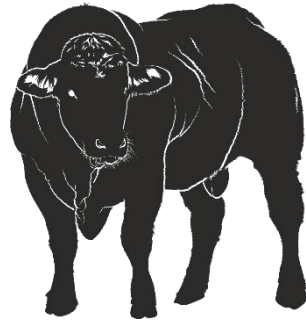


Example Bull (Sparky)
400 Day Weight EBV = +41 kg

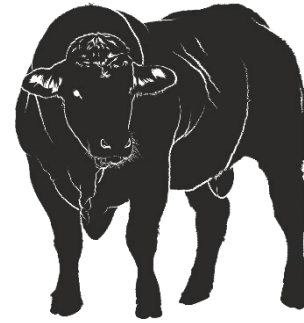


Bull 2 (Fred)
400 Day Weight EBV = +11 kg

2. Compare expected difference in progeny performance



Example Bull (Sparky)
400 Day Weight EBV = +41 kg



Bull 2 (Fred)
400 Day Weight EBV = +11 kg

The expected difference between progeny = $\frac{1}{2}$ difference in EBVs of sires

The difference in the 400 Day Weight EBVs for Sparky and Fred is 30 kg

How much heavier on average do we expect Sparky's progeny to be at 400 days of age compared to Fred's progeny?



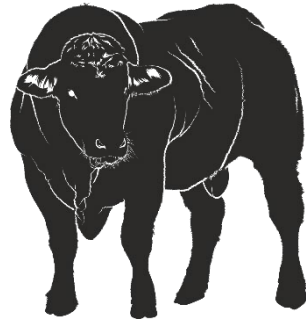
BREEDPLAN[®]

Genetic Evaluation

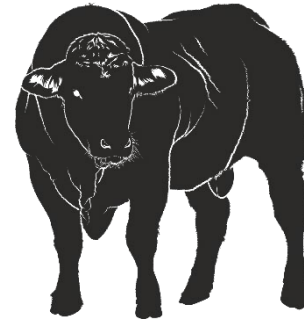
ABRI Innovative Agricultural Technology

Accelerating genetic progress in beef cattle since 1985

2. Compare expected difference in progeny performance



Example Bull (Sparky)
400 Day Weight EBV = +41 kg



Bull 2 (Fred)
400 Day Weight EBV = +11 kg

We expect Sparky's progeny to be on average **15 kg heavier at 400 days of age** than Fred's progeny

Extended to a year drop of 50 calves, this equates to a **potential production difference of 750 kg live weight** by the time the calves reach 400 days of age



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Genetic Evaluation

ABRI Innovative Agricultural Technology

Accelerating genetic progress in beef cattle since 1985

3. Consider EBV Accuracy

July 2026 South African Brahman Single-Step BREEDPLAN EBVs																		
	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	NFI-P	NFI-F
EBV	-3.9	0.0	+24	+45	+59	+50	+2	+2.0	-4.5	+35	+1.0	-1.4	-1.8	+1.1	-0.2	-0.5	-	-
Accuracy	83%	96%	93%	92%	91%	86%	85%	77%	35%	82%	42%	52%	52%	43%	30%	65%	-	-
Breed Avg. EBVs for 2024 Born Calves Click for Percentiles																		
EBV	-0.8	+1.8	+17	+26	+33	+35	+2	+0.8	-0.7	+18	+0.3	+0.0	+0.0	+0.0	+0.0	+0.7	-0.02	+0.00

Traits Analysed: BWT,200WT,400WT,600WT,SS

Statistics: Number of Herds: **14**, Progeny Analysed: **123**, Scan Progeny: **4**, Number of Dtrs: **32**

EBV accuracy provides a measure of **stability of the EBV** while also giving an indication of the **relative amounts of information** that have been used in the calculation of the EBV

The **higher** the EBV accuracy, the **less likely** it is to change as additional information on that animal and/or its relatives is analysed in future BREEDPLAN analyses

3. Consider EBV Accuracy

As a general rule, animals should be compared regardless of EBV accuracy



Trade-off between risk and gain

For More Information:

A BREEDPLAN Guide to Interpreting EBVs



TIP SHEET

BREEDPLAN Estimated Breeding Values (EBVs) provide estimates of the genetic merit of an animal for a range of economically important traits. BREEDPLAN EBVs allow beef producers to assess and compare the genetic merit of animals.

This tip sheet provides an overview of how to interpret BREEDPLAN EBVs. For the purposes of demonstration, please consider the set of EBVs shown at the bottom of this page.

WHAT DOES THE EBV MEAN?

EBVs are expressed as the difference between an individual animal's genetics and the genetic base (historic genetic level of the population) to which the animal is compared. Furthermore, each EBV is reported in the units in which the measurements are taken (e.g. Weight EBVs are reported in kilograms). On average, half of this difference will be passed on to the animal's progeny (the other half will come from the dam).

Please note that as each BREEDPLAN analysis has its own unique genetic base, **only EBVs produced in the same BREEDPLAN analysis can be directly compared**. A more detailed explanation is available in the [Comparing EBVs from Different Analyses](#) tip sheet, available from the [Help Centre](#) on the BREEDPLAN website.

HOW TO INTERPRET BREEDPLAN EBVS

When considering BREEDPLAN EBVs, beef producers may:

1. Compare to the level of genetic merit within the current population.
2. Compare expected difference in progeny performance.
3. Consider EBV accuracy.

1. COMPARE TO THE LEVEL OF GENETIC MERIT WITHIN THE CURRENT POPULATION

Comparing against the current levels of genetic merit allows producers to understand where an animal ranks within the evaluated population. This is important as most breeds have experienced significant changes in their genetic merit when compared to their historical genetic level (i.e. their genetic base) for most traits.

BREEDPLAN calculates the current level of genetic merit from the calving drop born two years prior to the current year (e.g. in 2023, the 2021 drop calves are used to define the current level of genetic merit). The reasons for using the calving drop born two years prior are two-fold. Firstly, given that some BREEDPLAN traits are not collected until the animals are rising two year old, this cohort has had the opportunity to be performance recorded for most traits when compared to younger animals. Secondly, many of the animals available for sale will belong to this cohort.

	Calving Ease DIR (%)	Calving Ease DTRS (%)	Gestation Length (days)	Birth Weight (kg)	200 Day Growth (kg)	400 Day Weight (kg)	600 Day Weight (kg)	Mature Cow Weight (kg)	Milk (kg)	Scrotal Size (cm)	Carcass Weight (kg)	Eye Muscle Area (sq. cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)
EBV	+1.2	+2.9	-8.0	+1.5	+30	+52	+59	+45	+10	+1.7	+34	+2.7	-0.1	-0.1	+0.9	+0.2
Accuracy	48%	46%	72%	70%	65%	66%	67%	45%	39%	63%	46%	36%	51%	48%	39%	41%
Breed Avg. EBVs	+0.5	+0.8	-2.1	+1.7	+21	+35	+48	+49	+7	+1.1	+30	+1.7	+0.0	-0.2	+0.8	+0.0



BREEDPLAN results are calculated by the Agricultural Business Research Institute using beef genetic evaluation analytical software developed by ASRI and Meat & Livestock Australia Limited.

For more information visit breedplan.une.edu.au

A BREEDPLAN Guide to Interpreting EBVs tip sheet



Available via the Help Centre on the BREEDPLAN website (breedplan.une.edu.au) or by scanning the QR code



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Using Selection Indexes effectively while balancing selection on traits



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What is the problem with selecting bulls on just a single trait?

Selecting on a single trait ignores the relationships between traits

	Calving Ease DIR (%)	Calving Ease DTRS (%)	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	NFI-F (kg/day)
EBV	-7.6	+1.8	-2.5	+10.4	+55	+92	+135	+180	+15	+3.5	-2.2	+81	+5.1	-0.8	-1.0	+1.0	+0.9	-	-
Acc	56%	51%	62%	77%	72%	73%	75%	74%	65%	61%	45%	66%	58%	63%	67%	60%	63%	-	-
Breed Avg. EBVs for 2014 Born Calves Click for Percentiles																			
EBV	+0.0	+1.1	-0.2	+4.3	+29	+48	+69	+64	+14	+1.7	-2.3	+43	+2.9	+0.4	+0.4	+0.8	+0.2	+2	+0.01

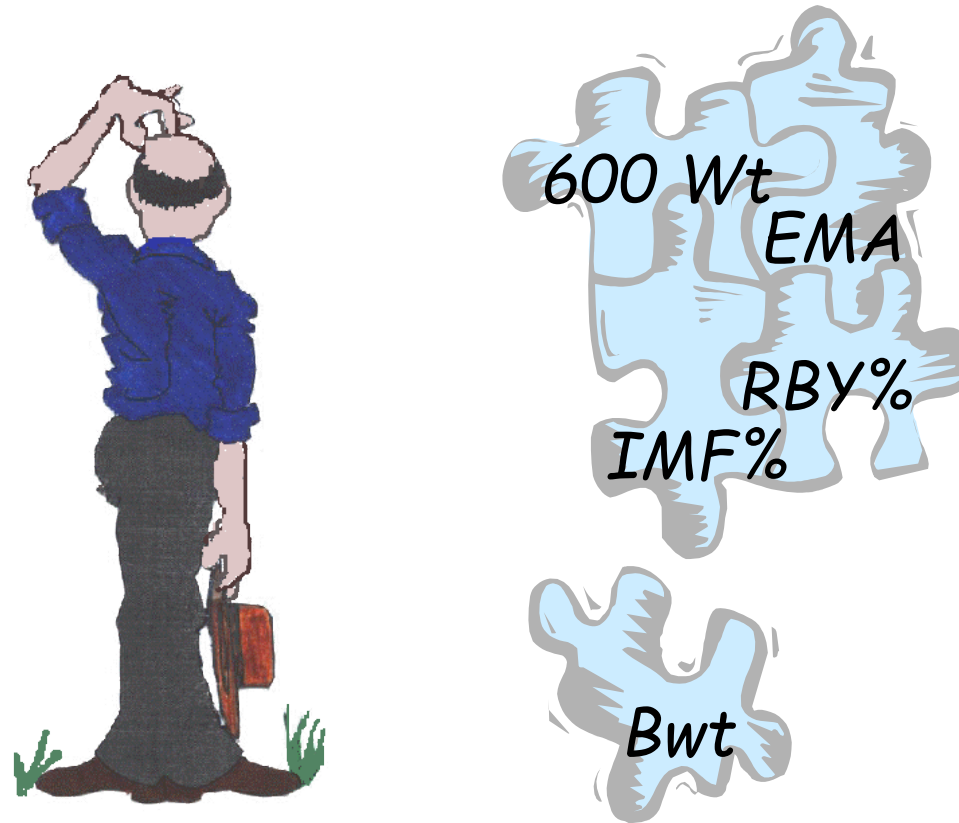
Traits Observed: BWT,200WT,400WT,600WT,MWT,FAT,EMA,IMF

Putting selection pressure on one trait **WITHOUT** considering other traits can cause the other traits to move in an unfavourable direction

What would happen if you were to select solely for growth?

- Decrease calving ease
- Increase birth weight
- Increase mature cow weight

HOW much emphasis should beef producers put on each trait?



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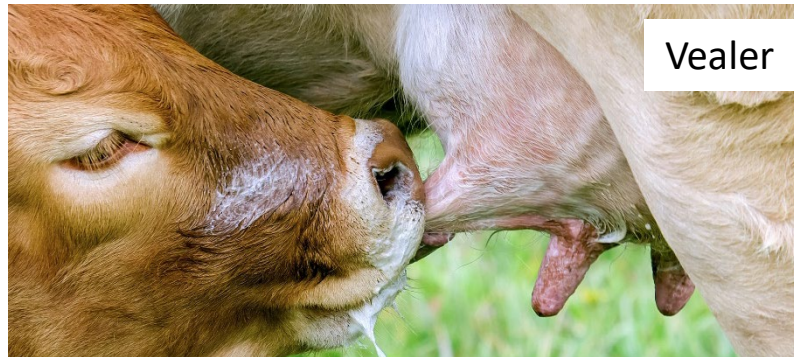
Selection Indexes provide a Simple Solution to a Complex Problem

- Selection indexes take into account the relevant **growth, carcass, fertility and efficiency attributes** of each animal to identify candidates whose progeny will be the **most profitable** for a particular commercial enterprise



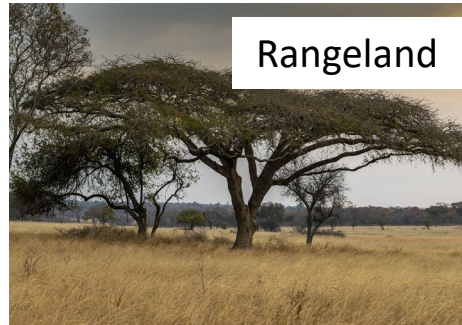
Selection Indexes provide a Simple Solution to a Complex Problem

- Provide an EBV for profit (AUS\$) for a specific production system/target market



Selection Indexes vary between countries

- Provide an EBV for profit (R) for a specific production



Selection Indexes provide a Simple Solution to a Complex Problem

- Provide an EBV for profit (R) for a specific production system/target market
 - Calculated by software that places weightings on individual traits that are deemed to be important for that production system
 - Weightings account for all elements of a production system including economics (costs and income), biology (genetics and nutrition) and population structure (number of deaths, replacements and sale animals)
 - Selection indexes therefore account for both sides of the profit equation and reflect the short- and long-term profit possible through selection of superior genetics

Interpreting Selection Indexes

July 2026 South African Brahman Single-Step BREEDPLAN EBVs																		
	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcass Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	NFI-P	NFI-F
EBV	-3.9	0.0	+24	+45	+59	+50	+2	+2.0	-4.5	+35	+1.0	-1.4	-1.8	+1.1	-0.2	-0.5	-	-
Accuracy	83%	96%	93%	92%	91%	86%	85%	77%	35%	82%	42%	52%	52%	43%	30%	65%	-	-
Breed Avg. EBVs for 2024 Born Calves Click for Percentiles																		
EBV	-0.8	+1.8	+17	+26	+33	+35	+2	+0.8	-0.7	+18	+0.3	+0.0	+0.0	+0.0*	+0.0	+0.7	-0.02	+0.00

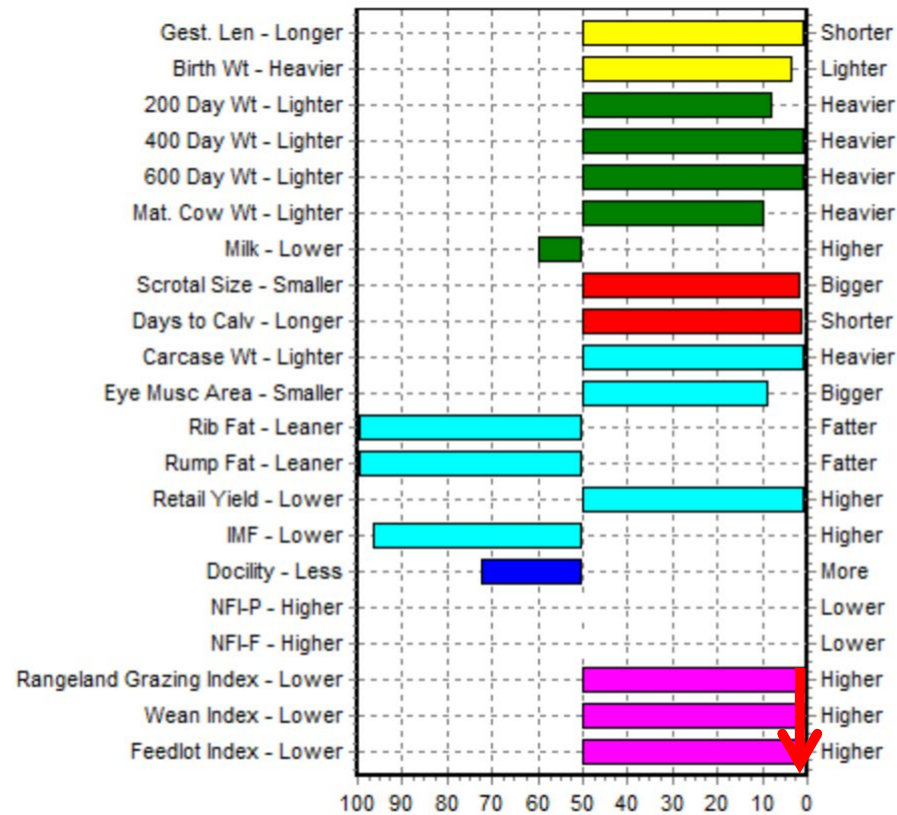
Traits Analysed: BWT,200WT,400WT,600WT,SS

Statistics: Number of Herds: **14**, Progeny Analysed: **123**, Scan Progeny: **4**, Number of Dtrs: **32**

SELECTION INDEX VALUES		
Market Target	Index Value	Breed Average
Rangeland Grazing Index (R)	+R 617	+R 91
Wean Index (R)	+R 376	+R 136
Feedlot Index (R)	+R 382	+R 86

As is the case with EBVs, Selection Indexes can also be compared with the Breed Average and Percentile Bands

Interpreting Selection Indexes



50th Percentile is the Breed Avg. EBVs for 2024 Born Calves

Interpreting Selection Indexes: Compare Expected Difference in Progeny Performance

Animal Name	Index A
Sparky	R500
Fred	R200

The expected difference in output = $\frac{1}{2}$ difference in Indexes of sires

Difference between Sparky and Fred is R300

How much more profitable do we expect Sparky's progeny to be compared to Fred's progeny?

Interpreting Selection Indexes: Compare Expected Difference in Progeny Performance

Animal Name	Index A
Sparky	R500
Fred	R200

We expect Sparky's progeny to be, on average, **R150 more profitable** per cow mated

If joined to 200 cows over their breeding life, this equates to $(200 \times R150)$
= R30,000 difference for this particular production system

Practical Bull Selection Using

BREEDPLAN



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How can beef producers make the best use of **BREEDPLAN** information in animal selection?



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A BREEDPLAN Guide to Animal Selection

A BREEDPLAN Guide to Animal Selection



TIP SHEET

The breeding decisions that a beef producer makes today will have a significant impact on the genetic progress and associated profitability of their herd into the future. Profitability of the herd will be influenced by the number of calves (fertility), the weight of the calves (growth) and the quality of the calves (carcase), less the cost of production. All of these components are influenced by genetics.

With the selection and purchase of an individual breeding animal being a long-term investment, it is important that beef producers take care to select the most profitable animals for their particular production system.

BREEDPLAN BEST PRACTICE GUIDE TO ANIMAL SELECTION

BREEDPLAN recommends using selection indexes (where available) as part of a selection strategy which also includes other selection tools (e.g. EBVs and visual assessment). By initially ranking animals using an appropriate selection index, beef producers ensure balanced selection for traits important to their production system.

The BREEDPLAN best practice guide to animal selection is to:

1. Identify the selection index of most relevance to you.
2. Rank animals using the chosen selection index.
3. Consider the individual BREEDPLAN EBVs of importance.
4. Consider other traits of importance.

1. IDENTIFY THE SELECTION INDEX OF MOST RELEVANCE

A number of breed societies publish selection index(es) for production systems in which their breed is commonly utilised. When deciding upon a selection index to use, beef producers should first consider which of the available selection indexes best represents their own production system. For seedstock producers, this may be the production system of their bull buying clients.

To assist beef producers in choosing the most relevant selection index for their production system, BREEDPLAN publishes a Using Selection Indexes tip sheet for each breed. These tip sheets contain an overview of each of the available Selection Index(es), and, for breeds with multiple indexes, may include a decision tree to help beef producers refine their selection index choice. All Selection Index tip sheets can be found in the [Help Centre](#) on the BREEDPLAN website.



Designed to ensure
balanced selection for
traits important to a
production system

Available now on the
BREEDPLAN Help Centre



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For more information visit breedplan.une.edu.au



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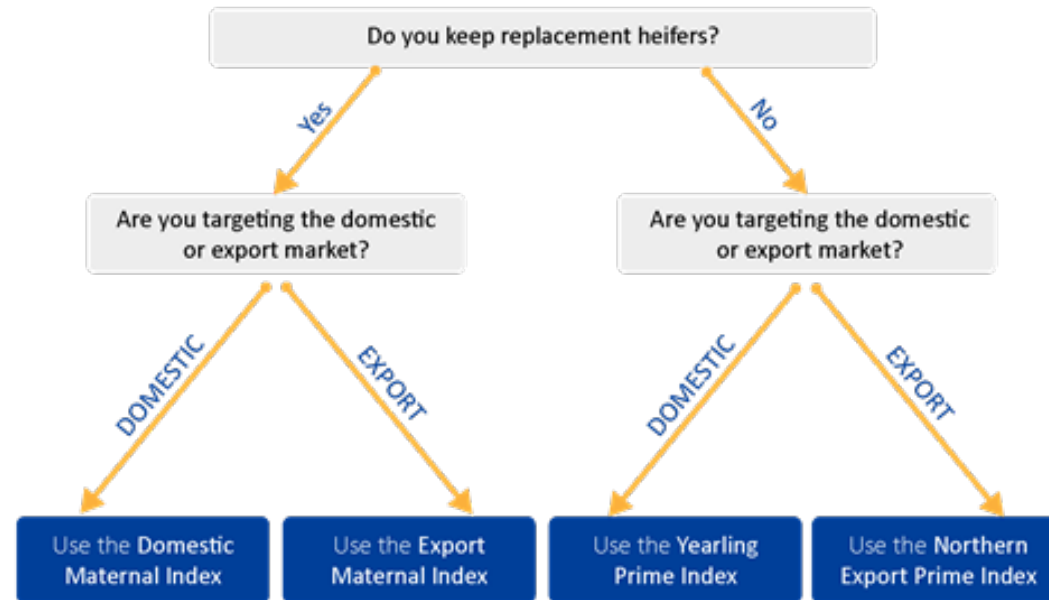
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A BREEDPLAN Guide to Animal Selection

Select the best genetics for your production system in four easy steps:

1. Identify the selection index of most relevance to you



A BREEDPLAN Guide to Animal Selection

Select the best genetics for your production system in four easy steps:

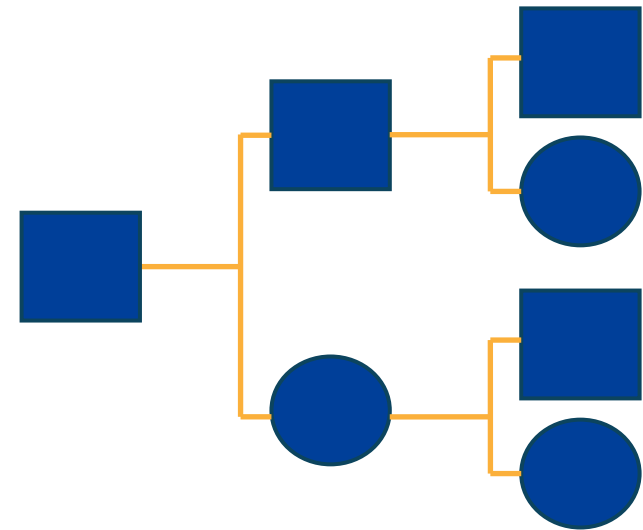
1. Identify the selection index of most relevance to you
2. Rank animals on the chosen selection index
3. Consider individual EBVs of importance

Lot	Name/ID	<u>Calving</u> <u>Ease</u> <u>DIR</u> (%)	<u>Calving</u> <u>Ease</u> <u>OTRS</u> (%)	<u>Gestation</u> <u>Length</u> (days)	<u>Birth</u> <u>Wt</u> (kg)	<u>200</u> <u>Day</u> <u>Wt</u> (kg)	<u>400</u> <u>Day</u> <u>Wt</u> (kg)	<u>600</u> <u>Day</u> <u>Wt</u> (kg)	<u>Mat</u> <u>Cow</u> <u>Wt</u> (kg)	<u>Milk</u> <u>Wt</u> (kg)	<u>Scrotal</u> <u>Size</u> (cm)	<u>Days</u> <u>to</u> <u>Calving</u> (days)	<u>Carcase</u> <u>Wt</u> (kg)	<u>Eye</u> <u>Muscle</u> <u>Area</u> (sq cm)	<u>Rib</u> <u>Fat</u> (mm)	<u>Rump</u> <u>Fat</u> (mm)	<u>Retail</u> <u>Beef</u> <u>Yield</u> (%)	<u>IMF</u> (%)	<u>Index (\$)</u>
38	Bull A	-5.1 50%	+0.3 41%	+0.2 64%	+6.9 79%	+53 72%	+60 73%	+53 74%	+68 64%	+2 59%	+1.7 54%	-1.6 40%	+44 64%	+2.3 54%	-0.9 68%	-1.3 68%	+1.7 63%	-0.4 59%	+\$ 49
21	Bull B	-2.9 35%	+0.4 26%	+0.3 51%	+4.5 65%	+49 68%	+51 68%	+49 68%	+70 59%	+1 46%	+1.3 70%	-2.5 29%	+45 60%	+2.9 50%	-0.3 59%	-0.4 59%	+1.2 55%	+0.1 48%	+\$ 49
52	Bull C	+0.6 32%	- -	-2.5 47%	+3.0 61%	+29 65%	+46 59%	+66 68%	+69 46%	+6 39%	+0.7 43%	- -	+44 49%	+1.7 35%	-0.4 44%	-0.5 44%	+1.1 40%	+0.2 37%	+\$ 49

A BREEDPLAN Guide to Animal Selection

Select the best genetics for your production system in four easy steps:

1. Identify the selection index of most relevance to you
2. Rank animals on the chosen selection index
3. Consider individual EBVs of importance
4. Consider other traits of importance
 - Pedigree



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 - Fertility (e.g. BULLCHECK®)



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Photo courtesy Wirruna Herefords

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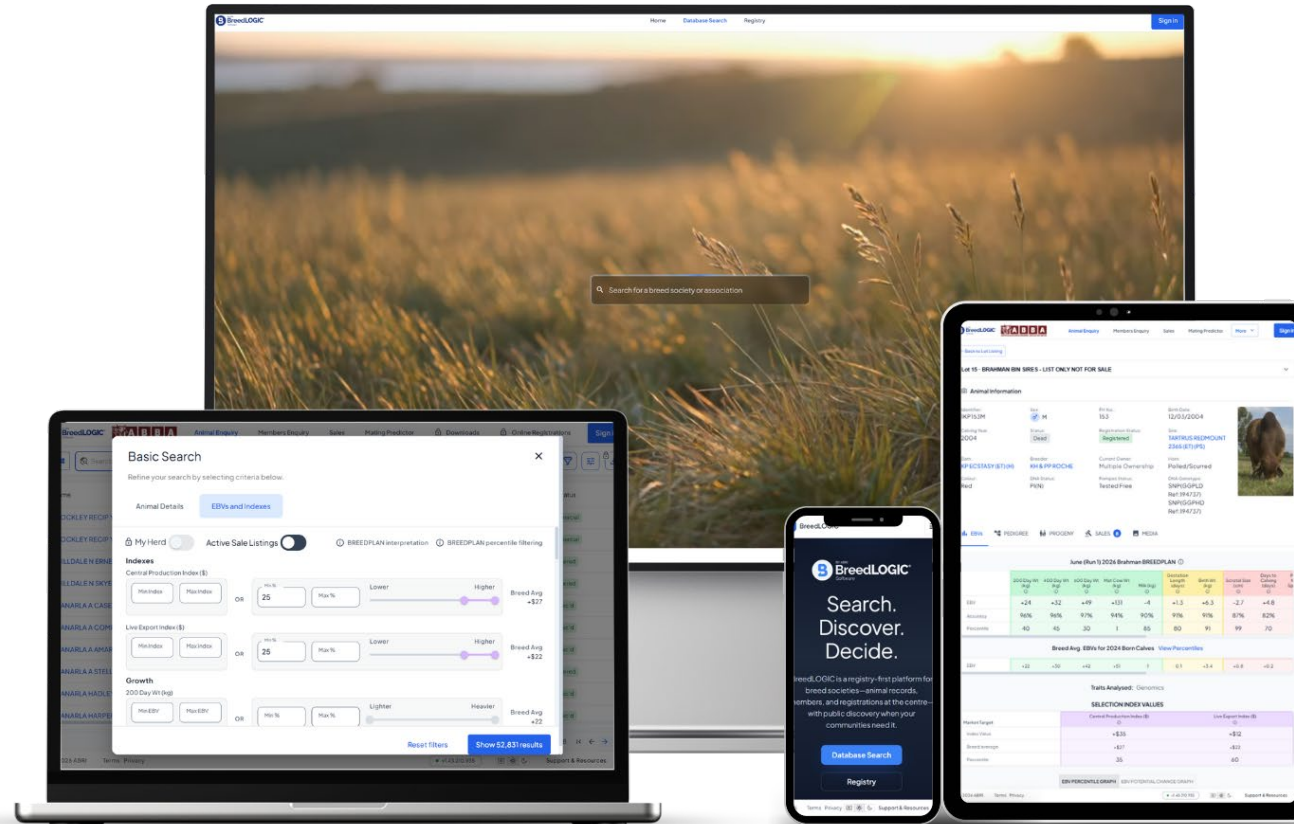
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Online search demonstration



Measuring and Accelerating Genetic Progress



BREEDPLAN®

Genetic Evaluation

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Accelerating genetic progress in beef cattle since 1985

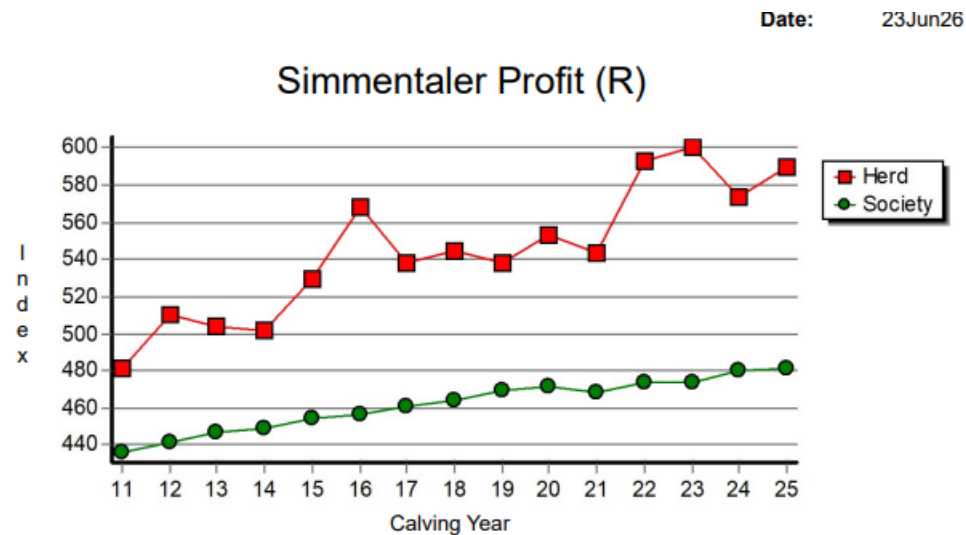
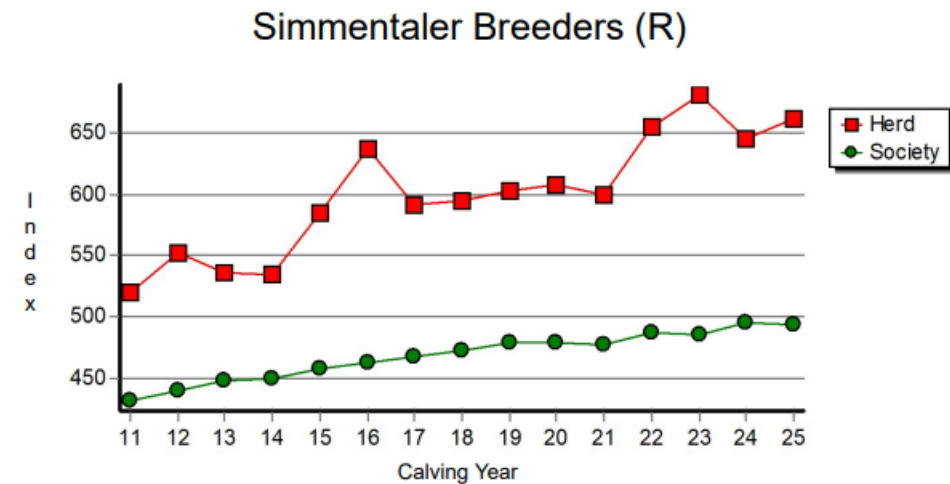
1. Understand Your Breeding Objective(s) and Where You Want to Go

- Allows you to evaluate where your herd is currently and consider where you would like your herd to go in the future



1. Understand Your Breeding Objective(s) and Where You Want to Go

- Understand your current position (relative to your breed) by viewing the genetic trend graphs in your BREEDPLAN report, which you can download from Internet Solutions



2. Record the Best Quality Data You Can!

- When recording performance data:
 - ✓ Plan your performance recording in advance
 - ✓ Aim to record performance around other routine management practices
 - ✓ Record all animals in the mob (not just the “best”)
 - ✓ Apply management groups to performance data when animals have been treated differently (and if you’re not sure, ask)

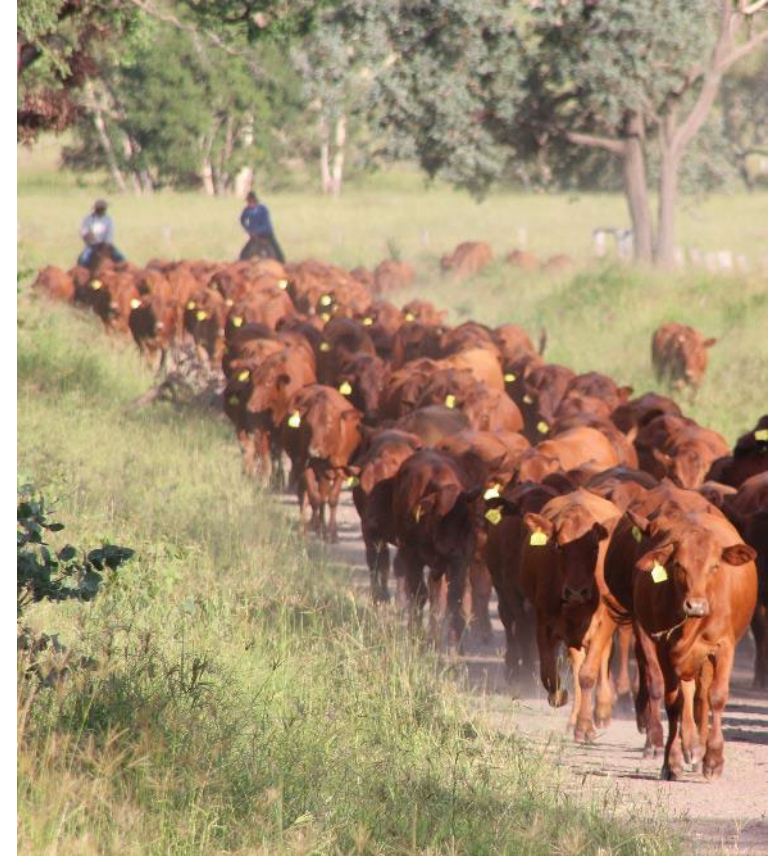
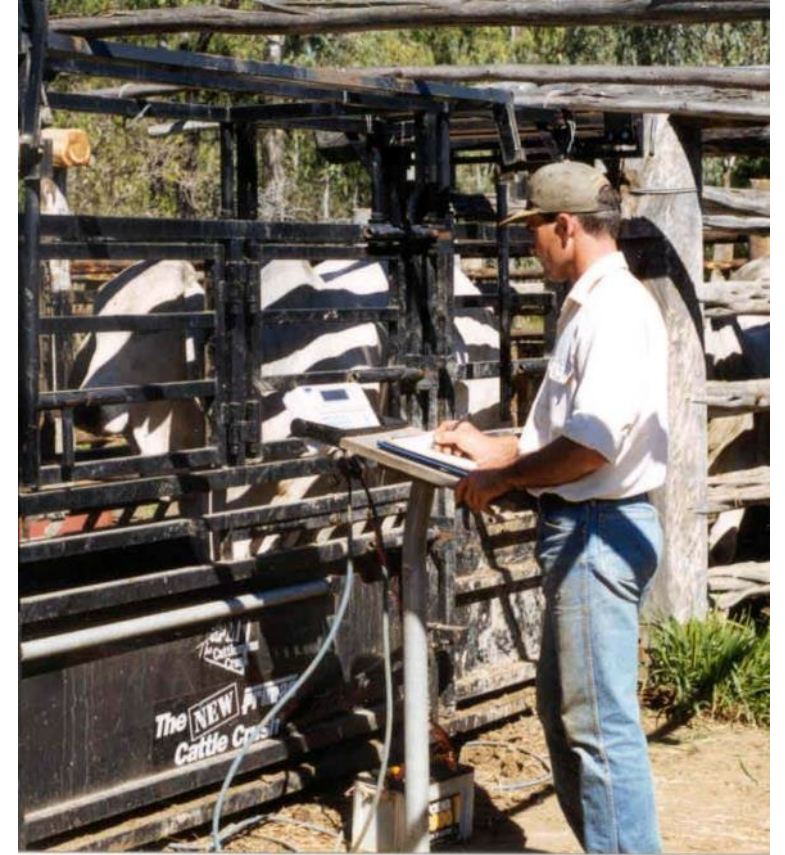


Photo courtesy Seifert Belmont Red

2. Record the Best Quality Data You Can!

- When recording performance data:
 - ✓ Aim to maximise contemporary group size
 - ✓ Aim for genetic linkage – commonly achieved by using outside AI sires
 - ✓ Submit performance information in a timely manner (no crime in submitting data ahead of time!)
 - ✓ Check and verify/correct your outliers

Remember, quality data = quality EBVs



Further Information on Performance Recording:



Contains:

- *Performance recording timeline*
- *Recording performance information*
- *Submitting performance information*
- *Other performance recording considerations*

Available via the BREEDPLAN website
(<https://breedplan.une.edu.au/>)

or by scanning the QR code

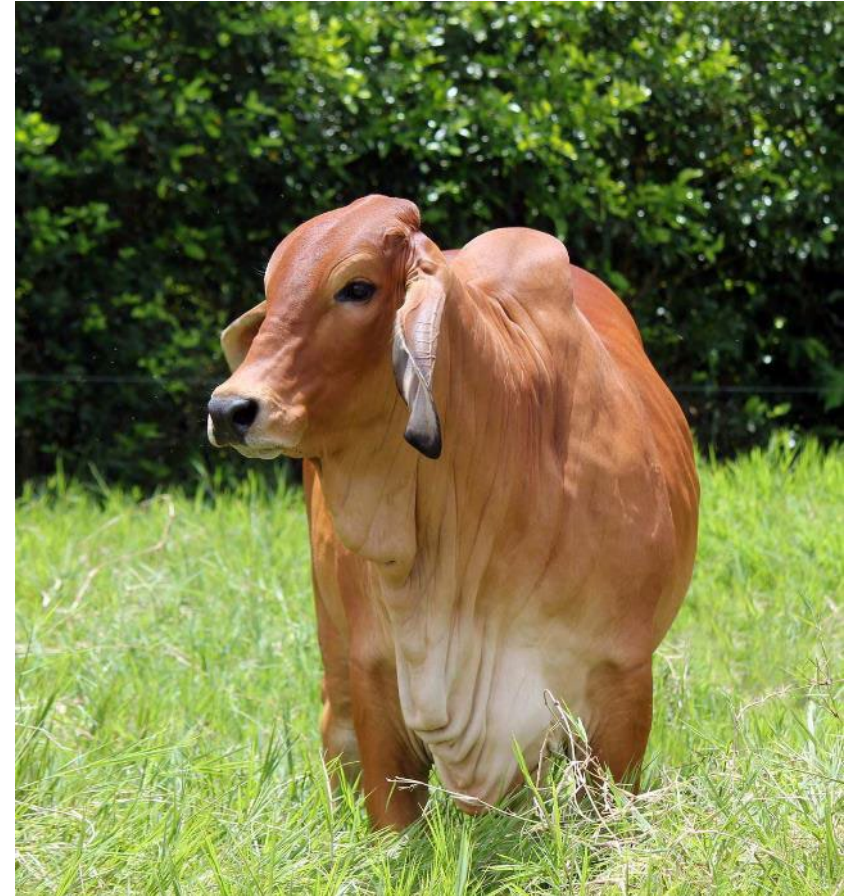


3. Use BREEDPLAN Information in Your Animal Selection Decisions

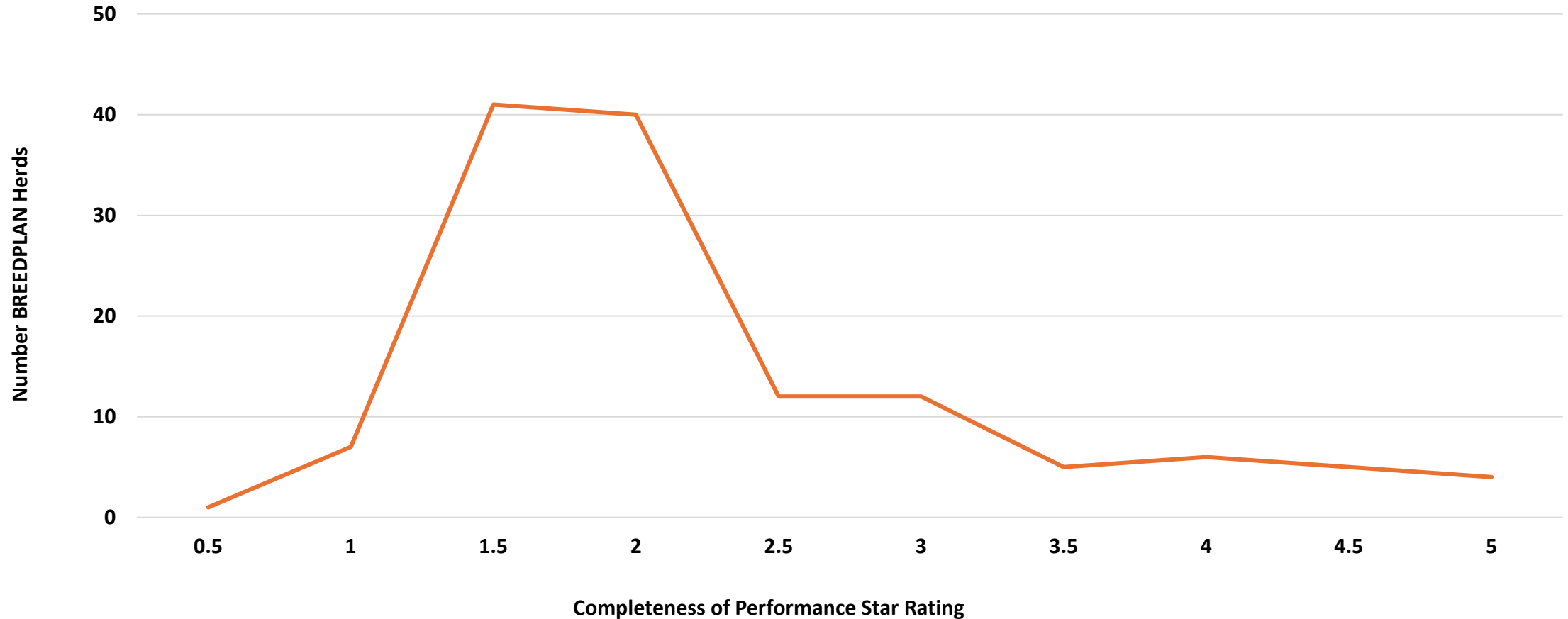
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Select the best genetics for your production system in four easy steps:

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By Making Best Use of BREEDPLAN, Genetic Progress is Possible!

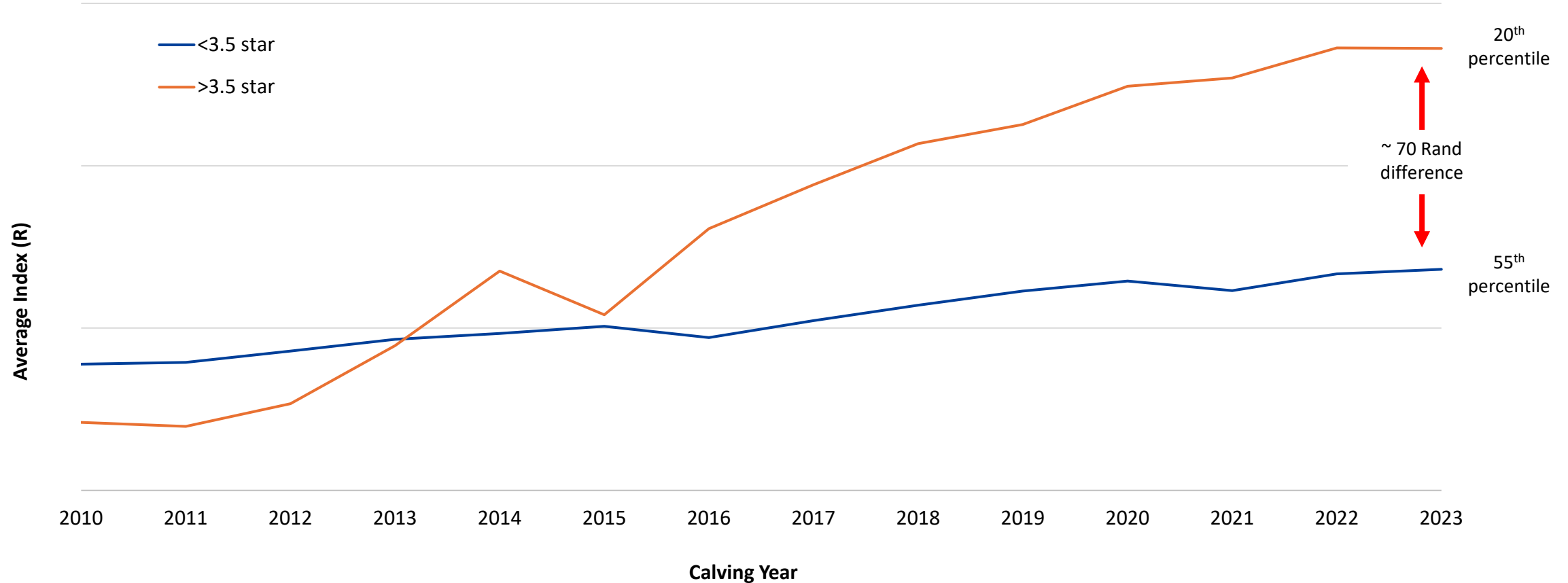


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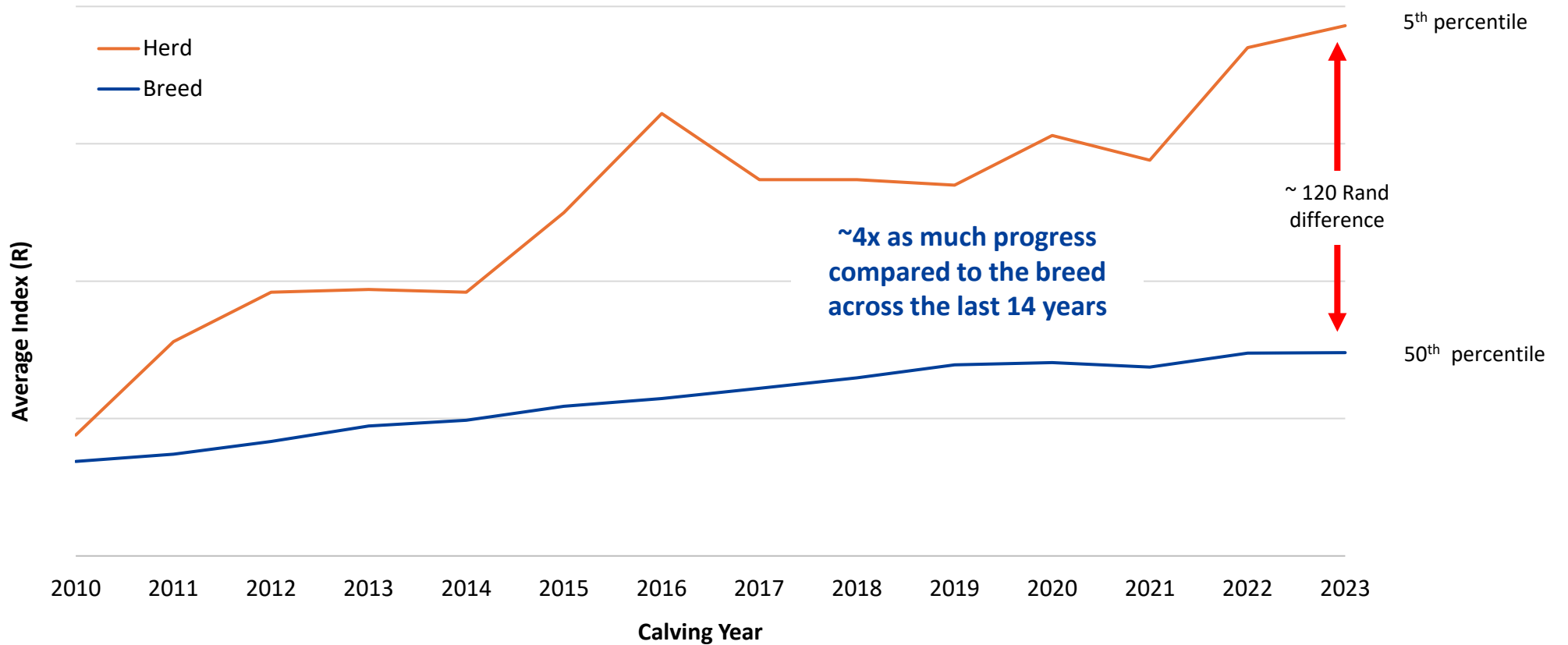
By Making Best Use of BREEDPLAN, Genetic Progress is Possible!



By Making Best Use of BREEDPLAN, Genetic Progress is Possible!



~150 calves
per year



Particularly impressive given its much harder to make progress when you are at the top!



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BREEDPLAN Resources

Available via
the Help
Centre on the
BREEDPLAN
website

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FETAL PROGRAMMING:

INVESTING IN
THE FUTURE



WILLEM AUGUSTYN

Your Partner in Profitable Animal Production

OVERVIEW

- Introduction to fetal programming
- Epigenetic mechanisms
- Fetal programming in Beef production
- Research and trial results
- Practical application



What is fetal programming?

- **Dutch Hunger Winter (1944–1945)**



Children wait to be fed during the Dutch Hongerwinter of 1944–1945.





- **Dutch Hunger Winter (1944–1945)**

- Food supplies were cut off during the final months of World War II due to a German blockade.
- Daily food intake dropped to approximately **500 calories per person**, less than one-quarter of the recommended intake.

- **Effects on Future Generations**

- Babies exposed to famine in the womb were often born **small and underweight**.
- As adults, they showed a **higher risk of obesity** compared with siblings born before or after the famine.
- Children who were in the womb during this severe wartime famine in the Netherlands experienced higher rates of type 2 diabetes and obesity later in life
- Researchers discovered persistent **epigenetic changes (DNA methylation)** in genes involved in growth, metabolism and disease.

- **Great Chinese Famine (1958–1961)**



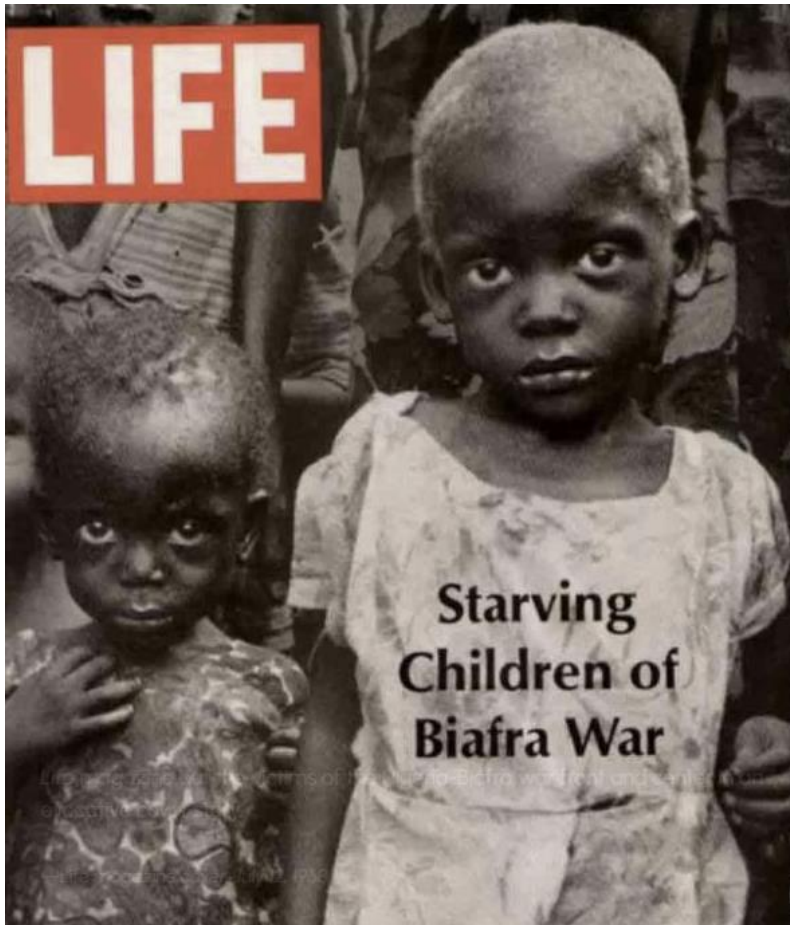
- **Great Chinese Famine (1958–1961)**

- Caused by a combination of failed agricultural policies, poor management and severe weather.
- Tens of millions of people died from widespread starvation.

- **Effects on Future Generations**

- Individuals exposed to famine before birth had an **increased risk of schizophrenia** later in life.
- Similar findings were observed in people conceived during the Dutch Hunger Winter, suggesting prenatal nutrition can influence brain development and long-term mental health

- **Biafra Famine (Nigeria, 1968–1970)**





- **Biafra Famine (Nigeria, 1968–1970)**

- Severe famine caused by civil war and food shortages.
- Used by researchers to compare the long-term effects of prenatal malnutrition with those seen in Europe.

- **Effects on Future Generations**

- Children exposed to famine before birth had an **increased tendency toward obesity** in adulthood, supporting findings from the Dutch famine studies.
- Greater risk for:
 - Type 2 diabetes
 - Insulin resistance
 - Cardiovascular disease

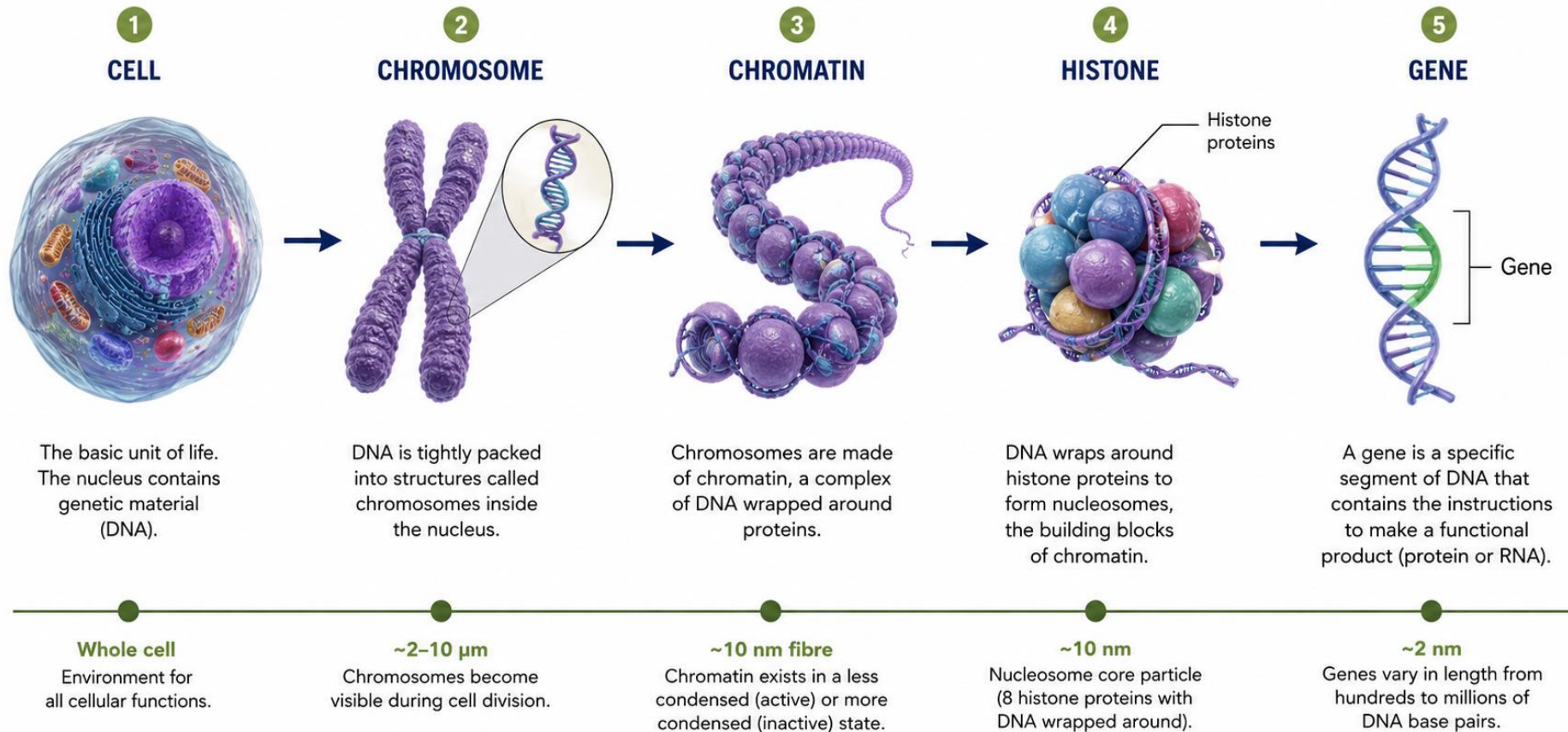
What is meant by fetal programming?

- Defined as maternal stimuli during pregnancy that can affect fetal development as well as how genes is expressed
- **Epigenetics:** is the biological process that control how genes are expressed

EPIGENETICS explained

- Epigenetics is the study of heritable changes in gene expression that occur without alterations in the underlying DNA sequence (Bird, 2007)

FROM CELL TO GENE: THE ORGANISATION OF GENETIC MATERIAL



- **Epigenetics** works through chemical modifications that acts like switches or dimmers on genes
 1. DNA methylation
 2. Histone Acetylation
 3. Histone Phosphorylation

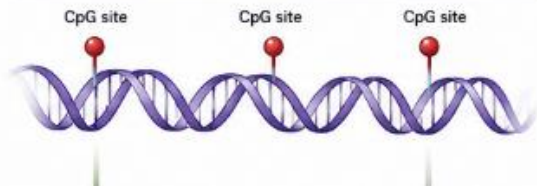
EPIGENETIC MECHANISMS

How gene expression is regulated without changing the DNA sequence

-  Methyl group (CH_3)
-  Acetyl group (COCH_3)
-  Phosphate group (PO_4^{3-})

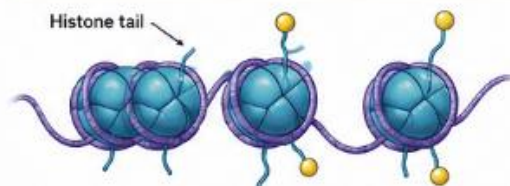
1. DNA METHYLATION

Methyl groups are added to DNA, usually at CpG sites. This typically switches genes OFF or reduces their activity.



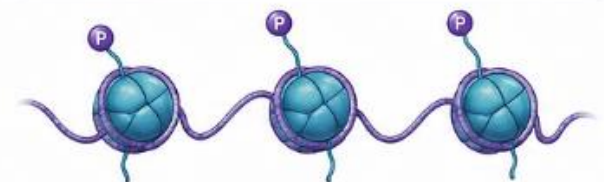
2. HISTONE ACETYLATION

Acetyl groups are added to histone tails. This loosens the DNA structure and usually switches genes ON or increases their activity.



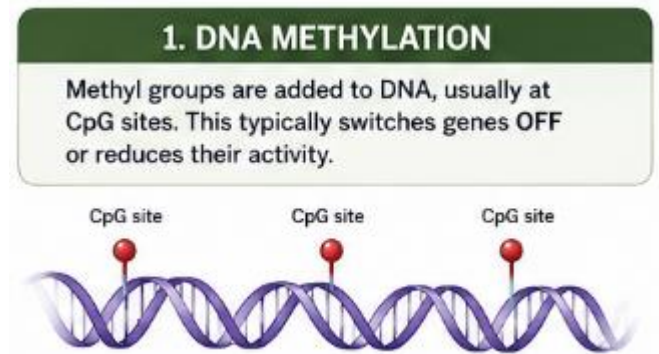
3. HISTONE PHOSPHORYLATION

Phosphate groups are added to histone tails. This can either activate or repress genes, depending on the site and context.



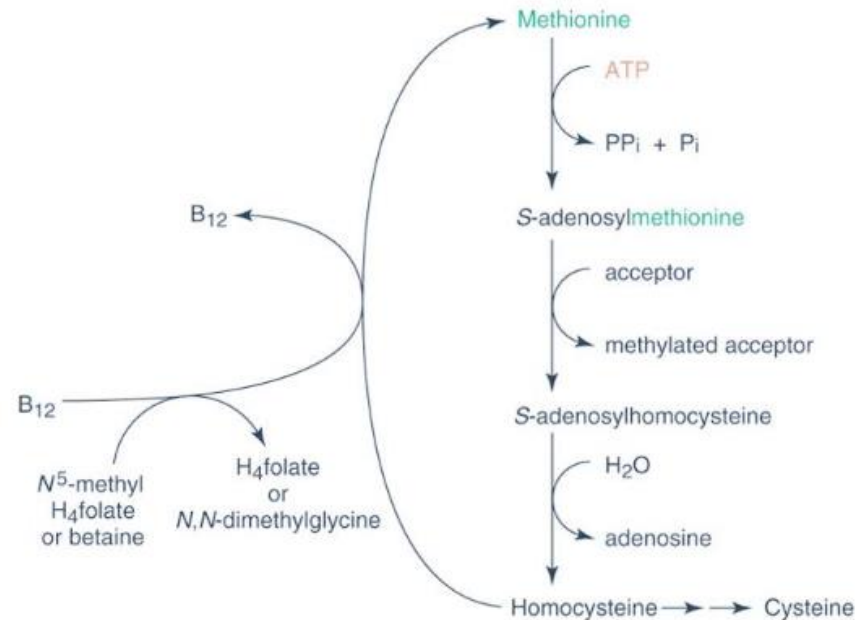
1. DNA- Methylation

- A methyl group (CH_3) is added directly to DNA
- Reduces or switches off gene expression
- Requires methyl donors such as:
 - Methionine
 - Choline
 - Folate (Vitamin B9)
 - Vitamin B12



Environmental effects on DNA- Methylation

- Maternal Nutrition
 - Nutrient that supply methyl groups
 - Methionine
 - Choline
 - Vitamin B9
 - Vitamin B12
 - Vitamin B6
 - Nutrients that are converted to S-adenosylmethionine (SAM)



(Dominguez-Salas *et al.*, 2012)



Environmental effects on DNA- Methylation

1. Energy and protein supply

- Under nutrition can alter methylation of genes involved in:
 - Muscle development
 - Growth
 - Fat metabolism

2. Heat stress

- Affect enzymes responsible for DNA methylation
- Change the expression of genes involved in fetal growth and placental function



Environmental effects on DNA- Methylation

3. Disease

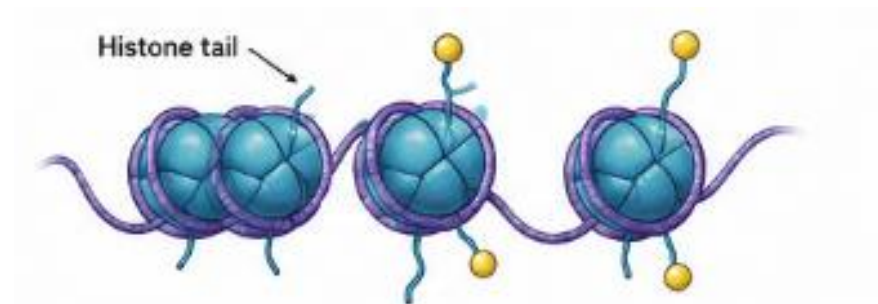
- Modify DNA methylation
- Alter immune-related gene expression
- Influence fetal immune system development

4. Stress

- Cortisol rising events
- Alter DNA methylation in Fetal tissues
- Affects
 - Brain development
 - Stress responses
 - Metabolism

2. Histone Acetylation

- DNA is wrapped around proteins called histones
- Acetyl groups (COCH_3) is added to histones:
 - Loosens the DNA
 - Makes genes easier to read
 - Usually increase gene expression
 - Removing acetyl groups tightens DNA and reduces gene expression





Environmental effects on Histone Acetylation

1. Maternal Nutrition

- Energy
- VFA – Acetate
- Amino acids

2. Energy balance

- Negative energy balance= less acetyl-CoA available
 - Affects muscle growth
 - Placental development
 - Energy metabolism of fetus



Environmental effects on Histone Acetylation

3. Heat stress

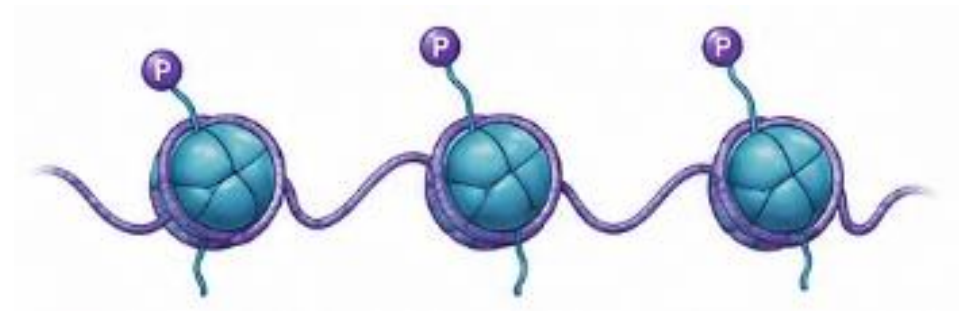
- Negative affects stress adaption
- Placental function
- Fetal growth

4. Disease

5. Stress

3. Histone Phosphorylation

- Phosphate group (PO_4^{3-}) is added to histones
- Phosphorylation helps regulate:
 - Gene activation
 - DNA repair
 - Cell division
 - Chromosome organization





Environmental effects on Histone Phosphorylation

1. Energy Restriction

- Activate AMP-Activated protein kinase (AMPK)
 - Turns on when cellular energy (ATP) drops

2. Protein Restriction

- Reduce activity of the mTOR pathway

3. Amino Acid Deficiency

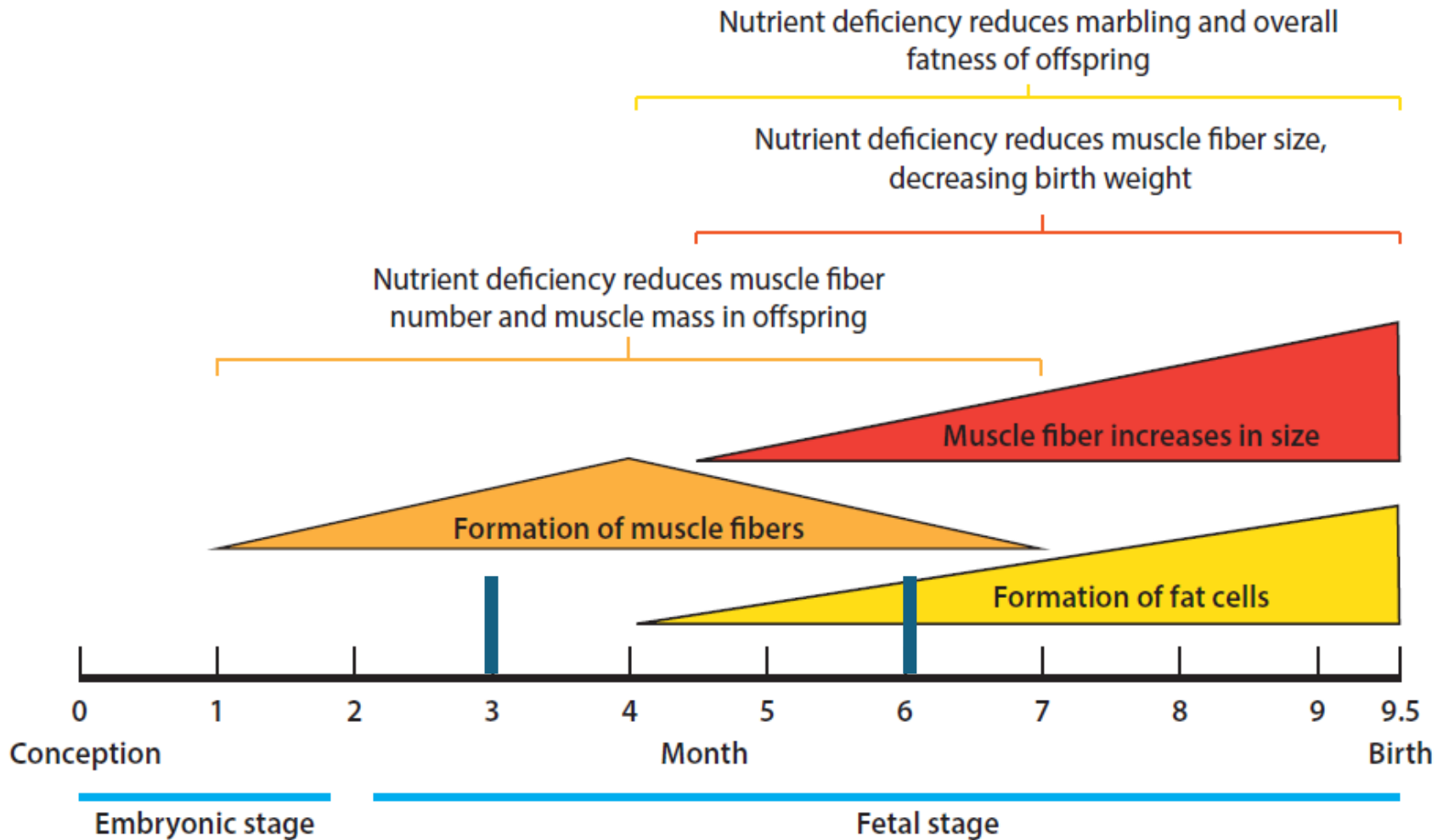
- Methionine
- Lysine
- Threonine

4. Mineral deficiencies



FETAL PROGRAMMING IN BEEF PRODUCTION

Fetal Development Timeline



(Llewellyn *et al.*, 2012)

- **Early to mid-gestation: muscle fibre formation**

- Primary muscle fibres form during the first 2 months.
- Most secondary muscle fibres form between approximately 2 and 7 months.
- Maternal nutrient deficiency reduces myogenic cell proliferation.
 - This results in fewer muscle fibres and lower lifetime muscle mass.
 - Muscle fibre number cannot be fully recovered after birth.

- **Early to mid-gestation: muscle fibre formation**
 - Maternal nutrient deficiency reduces myogenic cell proliferation.
 - This results in fewer muscle fibres and lower lifetime muscle mass.
 - Muscle fibre number cannot be fully recovered after birth.
 - Skeletal muscle is vulnerable to deficiencies
 - Lower priority in nutrient partitioning compared to brain, heart or other critical organs systems
 - *“In short, to enhance lean growth it is critically important to promote proliferation of myogenic precursor cells during the fetal stage” (Hu et al., 2017)*



- **Mid- to late gestation: fat-cell formation**

- Fat-cell development begins later than muscle development.
- Most adipocytes form during late gestation and early postnatal life.
- Maternal nutrient deficiency can reduce adipocyte formation.
- Fewer intramuscular adipocytes reduce the animal's potential for marbling.



- **Late gestation: muscle fiber growth**
 - Few new muscle fibers are formed after mid-gestation.
 - Existing fibers increase in diameter and length.
 - Nutrient deficiency limits muscle fiber enlargement.
 - **This can reduce fetal muscle mass, birth weight, and later growth performance.**

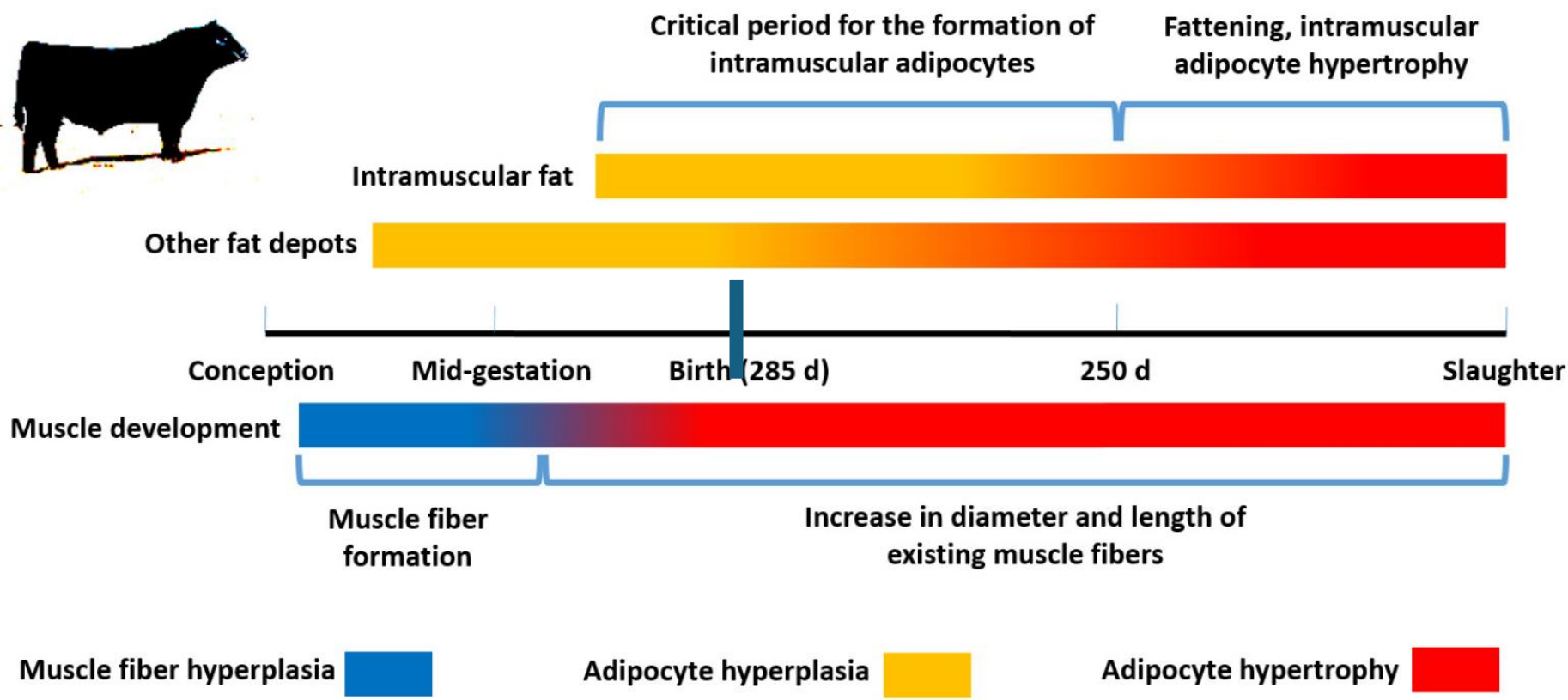


Figure 1. Timelines for skeletal muscle and adipose tissue development in beef cattle and pigs. The times for muscle fiber hyperplasia and hypertrophy and adipocyte hyperplasia and hypertrophy are approximate.

(Du *et al.*, 2017)



RESEARCH AND TRIAL RESULTS



Trial1 : Winter grazing and supplementation (Larson, 2009)

Winter grazing system and supplementation during late gestation influence performance of beef cows and steer progeny¹

D. M. Larson, J. L. Martin, D. C. Adams, and R. N. Funston²

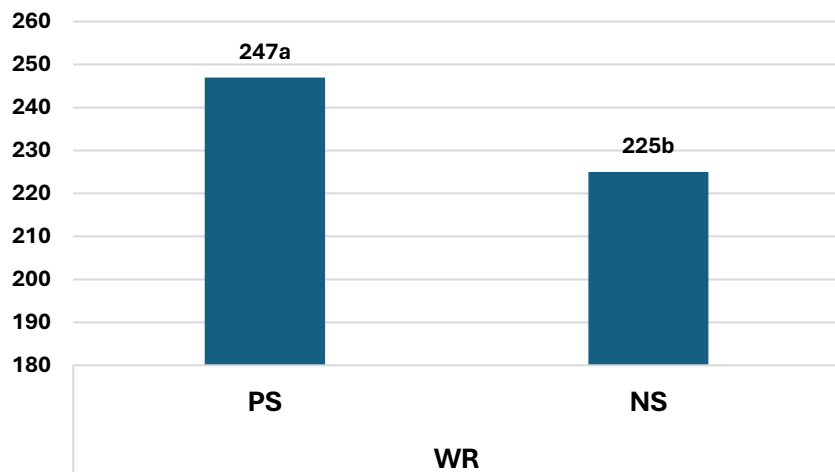
University of Nebraska West Central Research and Extension Center, North Platte 69101

Trial layout:

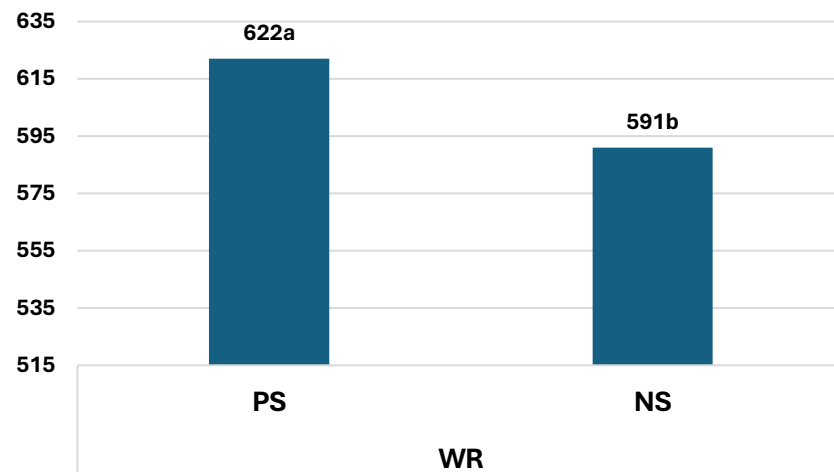
- 2x2 factorial design evaluating the effect of supplementation during the last trimester
- Animals grazing **Winter pastures (WR)** and corn residues (CR)
- Supplemented (PS) and no supplement (NS)
 - 28% CP supplement at 450g/head per day (126g protein)
- Growth data of calves



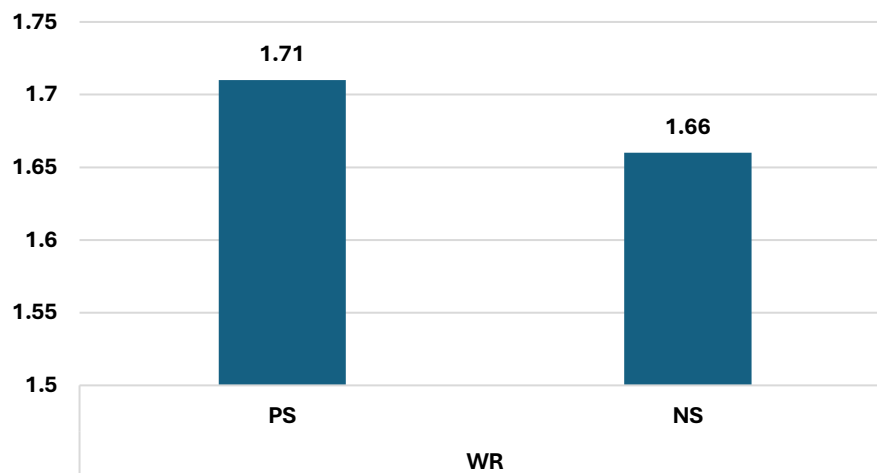
Calf (205-d) BW, kg (Larson, 2009)



FINAL BW Feedlot, kg (Larson, 2009)



ADG Feedlot, kg (Larson, 2009)





Trial 2: Reproduction (Martin *et al.*, 2007)

Effects of Dam Nutrition on Growth and Reproductive Performance of Heifer Calves

Jeremy L. Martin
Kim A. Vonnahme
Greg P. Lardy
Don C. Adams
Rick N. Funston¹

performance and calf weaning weight compared to cows fed cool-season grass hay (2005 *Nebraska Beef Report*, pp. 7-9).
The effects of dam nutrition dur-

the beginning of the breeding season in year 2 was determined by progesterone concentration in two blood samples collected 10 days apart. Progesterone concentration greater than

Layout:

- 2 x 2 factorial design in last trimester
 - Protein supplement (+/-450g of 42% CP supplement, 190g protein intake) vs No supplement
 - Cool season grass vs sub-irrigated meadow

Trial 2: Reproduction (Martin *et al.*, 2007)

Table 2. Effects of dam protein supplementation during the last trimester of gestation and grazing sub-irrigated meadow during early lactation on reproductive and calving performance of heifers^a.

Item	Treatment ^b				SEM	P-values	
	Prot	NoProt	Meadow	Hay		Gest	Spring
Cycling at beginning of breeding season, %	47	50	45	53		0.91	0.66
First service pregnancy rate, %	88	45	64	65		0.003	0.59
Overall pregnancy rate, %	94	73	82	82		0.06	0.76
Calving date, Julian day	63	71	68	66	3.3	0.07	0.71
Calf birth wt, lb	75	74	73	76	2.2	0.61	0.29
Unassisted births, %	69	38	56	50		0.08	0.92

^aIncludes reproductive data from 39 heifers born in year 2 and calving data from 32 heifers that became pregnant.

^bNo gestation by spring treatment interactions were detected, therefore only main effects are reported. Prot = dams supplemented three times pre week with the equivalent of 1 lb/hd/day 42% CP cake during the last trimester of gestation; NoProt = no protein supplement fed to dams during gestation; Meadow = dams grazed sub-irrigated meadows between the end of calving and the breeding season; Hay = dams fed cool-season grass hay from the end of the calving season until initiation of the breeding season.



Trial 3: Phosphorus (Castells *et al.* 2005)

- **Animals:** First-calf beef cows were used in the experiment.
- **2 × 2 factorial design** was employed.
- **Pregnancy treatments:** During **late pregnancy**, cows received either:
 - a **Low phosphorus (LowP)** diet, or
 - a **High phosphorus (HighP)** diet.
- **Lactation treatments:** After calving, for the **first 3 months of lactation**, cows were again allocated to either:
 - a **Low P** diet, or
 - a **High P** diet.

Trial 3: Phosphorus (Castells *et al.* 2005)

Table 6. Measurements in first-calf cows in early lactation that were fed diets low or high in phosphorus (P) concentration (LowP, HighP) during late pregnancy (preg) or the first 3 months of lactation; thus, the cows had a low or a high P status at calving and were fed low- or high-P diets in lactation ($n = 8$ or 9) (Castells *et al.* 2014, 2015)

LW, liveweight; DM, dry matter; CBT, cortical bone thickness. Values within a row followed by different letters are significantly different (at $P = 0.05$). In a 2×2 factorial analysis, the main effect of pregnancy was significant ($P < 0.01$)

Measurement	Low P in preg		High P in preg		s.e.m.	Significance
	LowP	HighP	LowP	HighP		
P intake (g P/day)	3.9	20.6	5.0	24.0	—	—
LW at calving (kg)	373b	357b	407a	416a	13.9	*
LW at weaning (kg)	300b	406a	342b	441a	16.9	*
DM intake (kg DM/day)	4.9b	9.4a	6.3b	10.9a	0.53	*
Milk production (kg/day)	4.9c	7.8ab	6.5b	8.7a	0.58	*
Calf growth (kg/day)	0.57c	0.83a	0.69bc	0.93a	0.052	*
Change in rib CBT (mm)						
Pregnancy		0.66		0.98	0.110	n.s.
Lactation	-1.56	-1.08	-1.13	-0.92	0.249	n.s.

Trial 4: Protein Supplementation in the 2nd Trimester (Miguel-Pacheco *et al.*, 2016)

Increased dietary protein in the second trimester of gestation increases live weight gain and carcass composition in weaner calves to 6 months of age

G. G. Miguel-Pacheco¹, L. D. Curtain², C. Rutland¹, L. Knott³, S. T. Norman⁴, N. J. Phillips³
and V. E. A. Perry^{1,5†}

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(Received 14 February 2016; Accepted 29 September 2016; First published online 8 November 2016)



Trial 4: Protein Supplementation in the 2nd Trimester (Miguel-Pacheco *et al.*, 2016)

- **Animals:** 80 genetically similar Polled Hereford heifers from a closed pedigree herd were artificially inseminated to the same sire to minimize genetic variation.
- **Experimental design:** A **2 × 2 factorial design** was used to evaluate the effects of maternal protein intake during the **first trimester (36–90 days)** and **second trimester (90–180 days)** of gestation.
- **Dietary treatments:**
 - **High protein:** ~15.7% crude protein.
 - **Low protein:** ~6.0% crude protein.At 90 days of gestation, half of the heifers in each first-trimester treatment were switched to the opposite diet, creating four treatment groups (HH, HL, LH, LL).



Trial 4: Protein Supplementation in the 2nd Trimester (Miguel-Pacheco *et al.*, 2016)

- High protein supplementation during the second trimester significantly **increased** calf growth rate from birth to weaning.
- By 6 months of age, these calves were 33 kg heavier (approximately 16%) than calves whose dams received the low-protein diet during the **second trimester**.
- The higher-protein diet also resulted in a greater average daily gain (ADG), demonstrating that nutrition during mid-gestation permanently enhanced the calf's growth potential.

Feed sources	T1		T2		T3
	(36 to 90)		(90 to 180)		181 to term
	High	Low	High	Low	All cows
Energy intake (MJ)	70.50	57.50	72.20	64.00	63.40
Energy (%NRC ²)	100.00	90.00	103.00	92.00	101.00
CP (kg)	1.18	0.38	1.22	0.40	0.99
CP (%)	15.70	5.98	15.64	6.05	13.70
CP (%NRC)	174.00	66.00	179.00	70.00	125.00

Trial 4: Protein Supplementation in the 2nd Trimester (Miguel-Pacheco *et al.*, 2016)

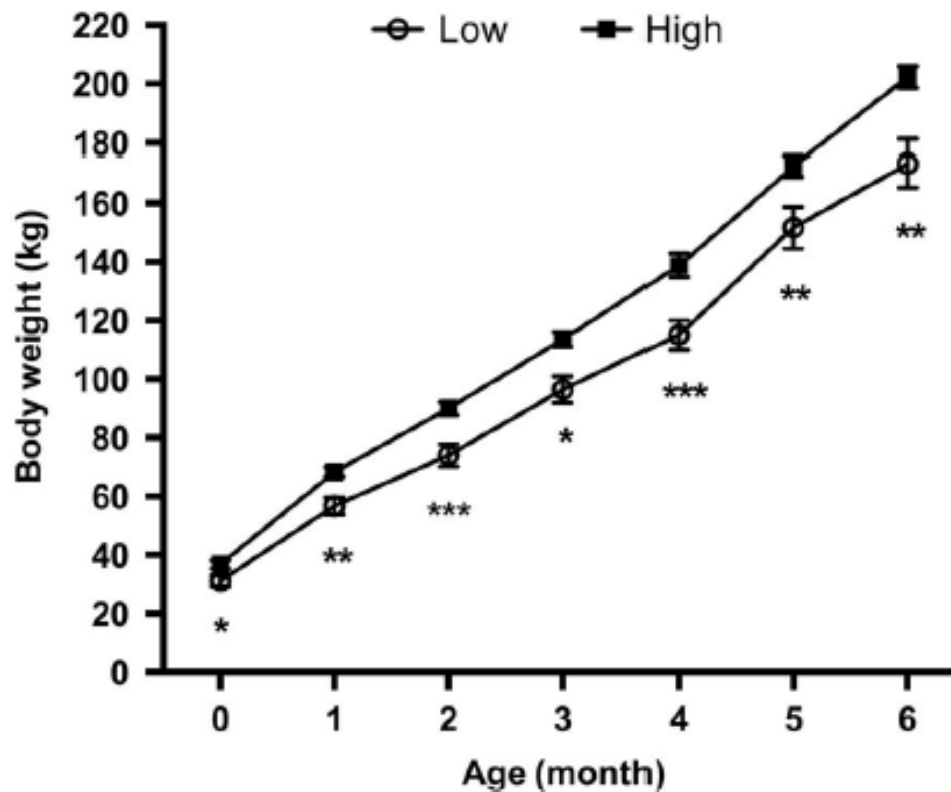


Figure 1 Mean and $\pm$ SEM of calf body weight from birth (0 months) until 6 months of age by treatment during the second trimester. Levels of significance indicated by * $P < 0.05$, ** $P < 0.01$ and *** $P < 0.001$, respectively.

Trial 5: Nutrition (Café *et al.*, 2006)

Influences of nutrition during pregnancy and lactation on birth weights and growth to weaning of calves sired by Piedmontese or Wagyu bulls

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Trial 5: Nutrition (Café *et al.*, 2006)

- **Animals:** 513 Hereford cows and heifers were mated by artificial insemination to either **Wagyu** (high marbling) or **Piedmontese** (high muscling) sires over two breeding cycles.
- **Experimental design:**
 - Cows were assigned to either a **high** or **low plane of nutrition** from approximately **80 days of gestation until calving**. After calving, cow-calf pairs either remained on the same nutritional treatment or switched to the opposite treatment, creating four treatment groups:
 - High-High (HH)
 - High-Low (HL)
 - Low-High (LH)
 - Low-Low (LL)

Trial 5: Nutrition (Café *et al.*, 2006)

Table 5. Growth of calves to weaning showing pregnancy and pre-weaning nutritional treatment interactions

Values are predicted means from models described in the ‘Statistical analyses’ section of Materials and methods. LL, low pregnancy and low pre-weaning nutrition; LH, low pregnancy and high pre-weaning nutrition; HL, high pregnancy and low pre-weaning nutrition; HH, high pregnancy and high pre-weaning nutrition. Means within rows followed by different letters are significantly different ($P = 0.05$)

	Pregnancy and pre-weaning nutrition				s.e.d.
	LL	HL	LH	HH	
Number of calves	127	128	110	170	
Birth liveweight (kg)	31.8a	35.0b	31.5a	35.3b	0.67
Weaning liveweight (kg)	154a	175b	200c	215d	4.9
Birth to weaning ADG (g)	570a	665b	784c	852d	19.9
Birth to weaning gain (kg)	122a	140b	169c	180d	4.6
Age at weaning (days)	214a	211a	216a	211a	2.9



Trial 6: Trace minerals

Effects of organic or inorganic cobalt, copper, manganese, and zinc supplementation to late-gestating beef cows on productive and physiological responses of the offspring¹

**R. S. Marques,* R. F. Cooke,^{*2,3} M. C. Rodrigues,*†
B. I. Cappellozza,* R. R. Mills,‡ C. K. Larson,§ P. Moriel,# and D. W. Bohnert***

*Oregon State University – Eastern Oregon Agricultural Research Center, Burns 97720;

†São Paulo State University – Department of Animal Production, Botucatu 18168-000, Brazil;

‡Oregon State University – Umatilla County Extension Office, Pendleton 97801; §Zinpro Corporation, Eden Prairie, MN 55344; and #North Carolina State University – Mountain Research Station, Waynesville 28786

- 84 Angus x Hereford cows
 - Sulfate sources of Cu, Co, Mn and Zn (INR)
 - Organic sources of Cu, Co, Mn and Zn (AAC)
 - No Supplements (CON)



Trial 6: Trace minerals

- Fed Cows in 3 groups (CON, INR, AAC) last trimester until calving
- After calving all cows were managed on a same supplementation program
- Calves were weaned on d-283
 - 45 day preconditioning treatment (until d-328)
 - Growing period (d-328 to 440)
 - Finishing (d-440 until slaughter)



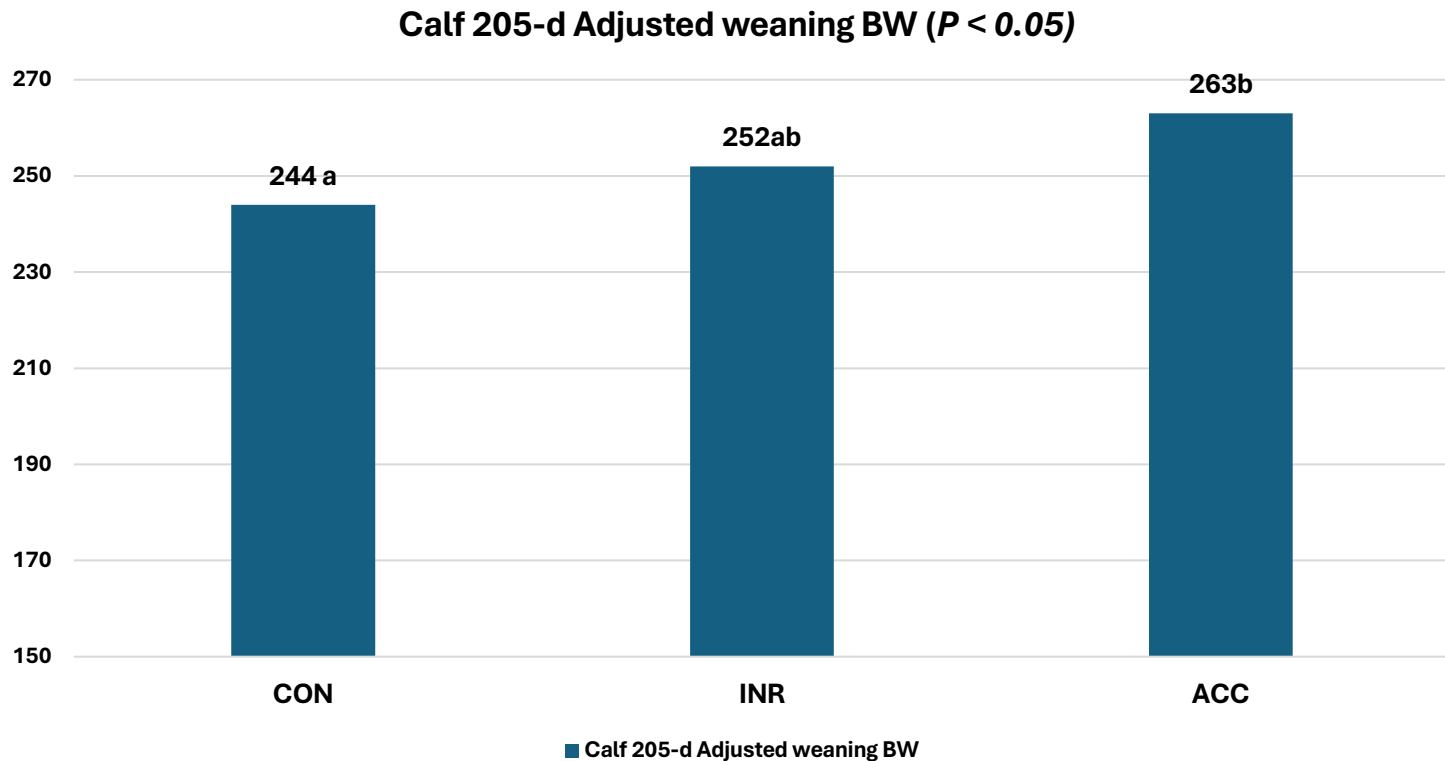
Trial 6: Trace minerals

- Concentrations of Co, Cu, Mn, and Zn in cotyledons and liver from newborn calves born from beef cows that received diets containing no supplemental Cu, Co, Mn, and Zn (CON); sulfate sources of Cu, Co, Mn, and Zn (INR); or organic complexed source of Cu, Mn, Co, and Zn (AAC) during the last trimester of gestation:

Item	CON	INR	AAC	SEM	<i>P</i> -value
Co, mg/kg					
Cotyledon	0.13 ^a	0.20 ^b	0.24 ^b	0.03	0.02
Calf	0.09 ^a	0.12 ^b	0.13 ^b	0.01	<0.01
Cu, mg/kg					
Cotyledon	3.88 ^a	4.75 ^{ab}	5.12 ^b	0.39	0.09
Calf	362 ^a	428 ^{ab}	450 ^b	30	0.10
Mn, mg/kg					
Cotyledon	22.0	18.2	22.9	4.5	0.73
Calf	5.82	5.22	5.83	0.36	0.43
Zn, mg/kg					
Cotyledon	65	66	68	4	0.87
Calf	456 ^a	562 ^{ab}	660 ^b	57	0.01

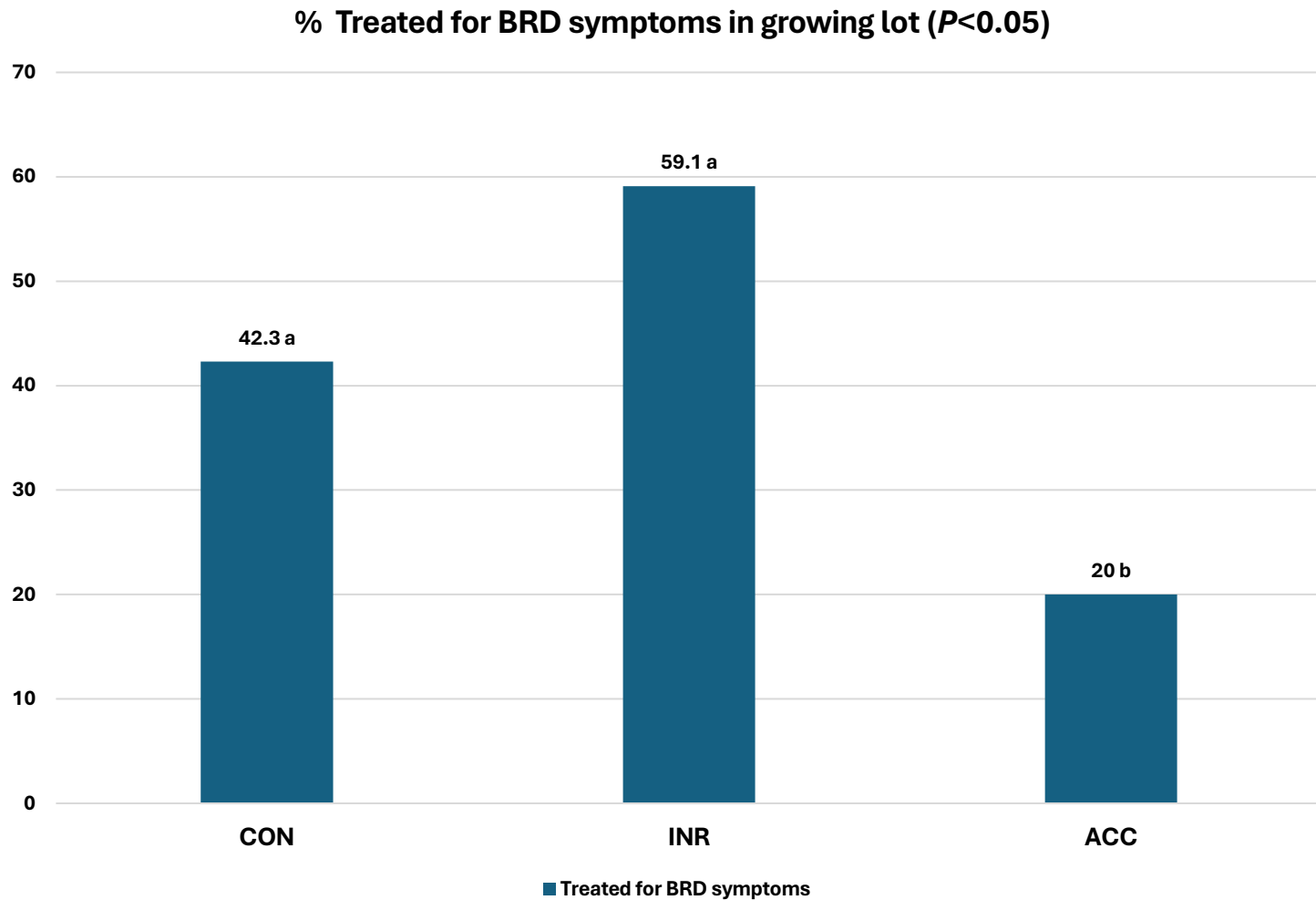


Trial 6: Trace minerals



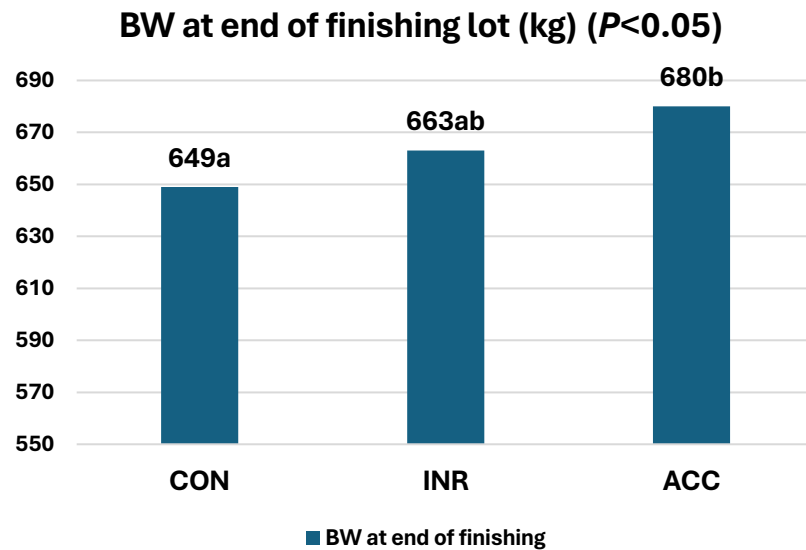
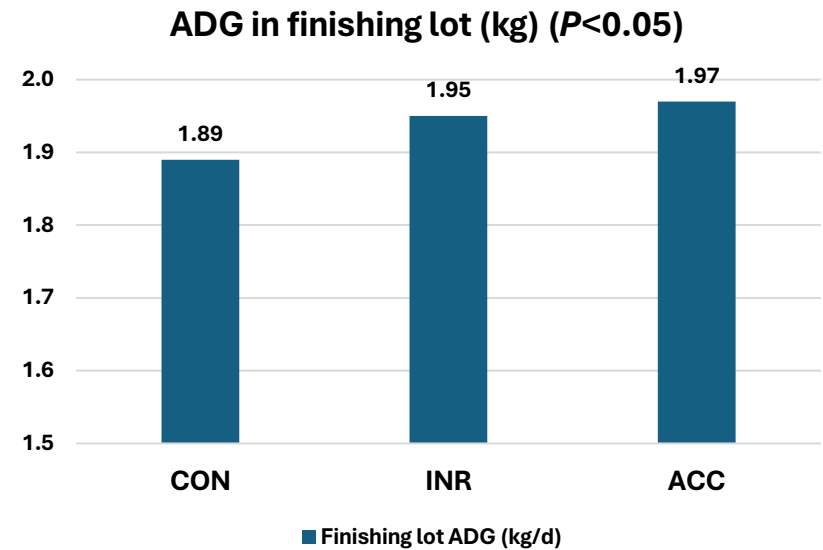


Trial 6: Trace minerals





Trial 6: Trace minerals





Trial 6: Trace minerals

Take away:

- Supplementing beef cows during late gestation with organic trace minerals (Co, Cu, Zn, Mn)
 - Increased weaning weight
 - Reduced BRD incidences in growing phase
 - Finished at a higher weight in the feedlot



Practical Application in Beef Production

1. Match supplementation to stage of gestation

- Early to mid gestation – support muscle-fibre formation
- Late gestation: support muscle growth and fat cell development

2. Prioritize metabolizable protein supply

- Microbial protein (1st)
 - NDF (Sweet veld vs sourveld)
 - NSC (Non-structural carbohydrates) – Sugars/starches
 - Rumen degradable protein (RDP) or Non-nitrogen protein (NPN)
- By-pass proteins

3. Manage mineral and trace-mineral nutrition

- Phosphorus is essential
- Ensure adequate levels of copper, cobalt, manganese, selenium and zinc



Practical Application in Beef Production

4. Avoid prolonged maternal undernutrition
 - Maintain Body condition during gestation.
 - If animal loose body condition during gestation the foetus is under enormous nutritional stress
5. Monitor cow condition (body weights)
 - Make informed decision regarding supplementation
6. Measure outcomes and define targets for yourself
 - Weaning weights
 - Fertility records
 - Growth rates of progeny
 - Health treatments



Practical Application in Beef Production

7. Invest in the future of your herd!



THANK YOU

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DIRECTORATE OF VETERINARY SERVICES



Livestock Disease update

15 September 2026

Dr P.V. Makaya

Chief Director, Veterinary Services

DVS Mandate

To prevent the entry, establishment, and spread of animal diseases of zoonotic and economic importance, to safeguard animal and human health for the improvement of livelihoods and the national economy.



To facilitate trade in live animals and animal products by controlling or eradicating diseases of zoonotic and economic importance.



On behalf of the MAMWRD, effect the execution of the Animal Welfare Act and ensure that issues of animal welfare and ethics are observed and complied with.

DVS Priority Diseases of Zoonotic and Economic Importance

Zoonotic Diseases
(Anthrax, Rabies,
Brucellosis, Avian
Influenza, Other One
Health Conditions- AMR,
Residues etc.)

Economic Importance
(FMD, New Castle, TBDs,
Avian Influenza,
Brucellosis etc.)

FMD disease situation

Cases of Foot and Mouth disease continue to be reported in certain infected districts in Matabeleland South and North.

The affected districts have been placed under movement quarantine, and farmers are being warned of the consequences of illegal movements. Awareness campaigns remain ongoing in the affected areas .

Vaccination campaigns of all susceptible populations are expected as soon as the vaccine arrives .All buffalo holding properties are to be inspected to ensure that buffalo cattle contact is limited .



Lumpy skin disease situation

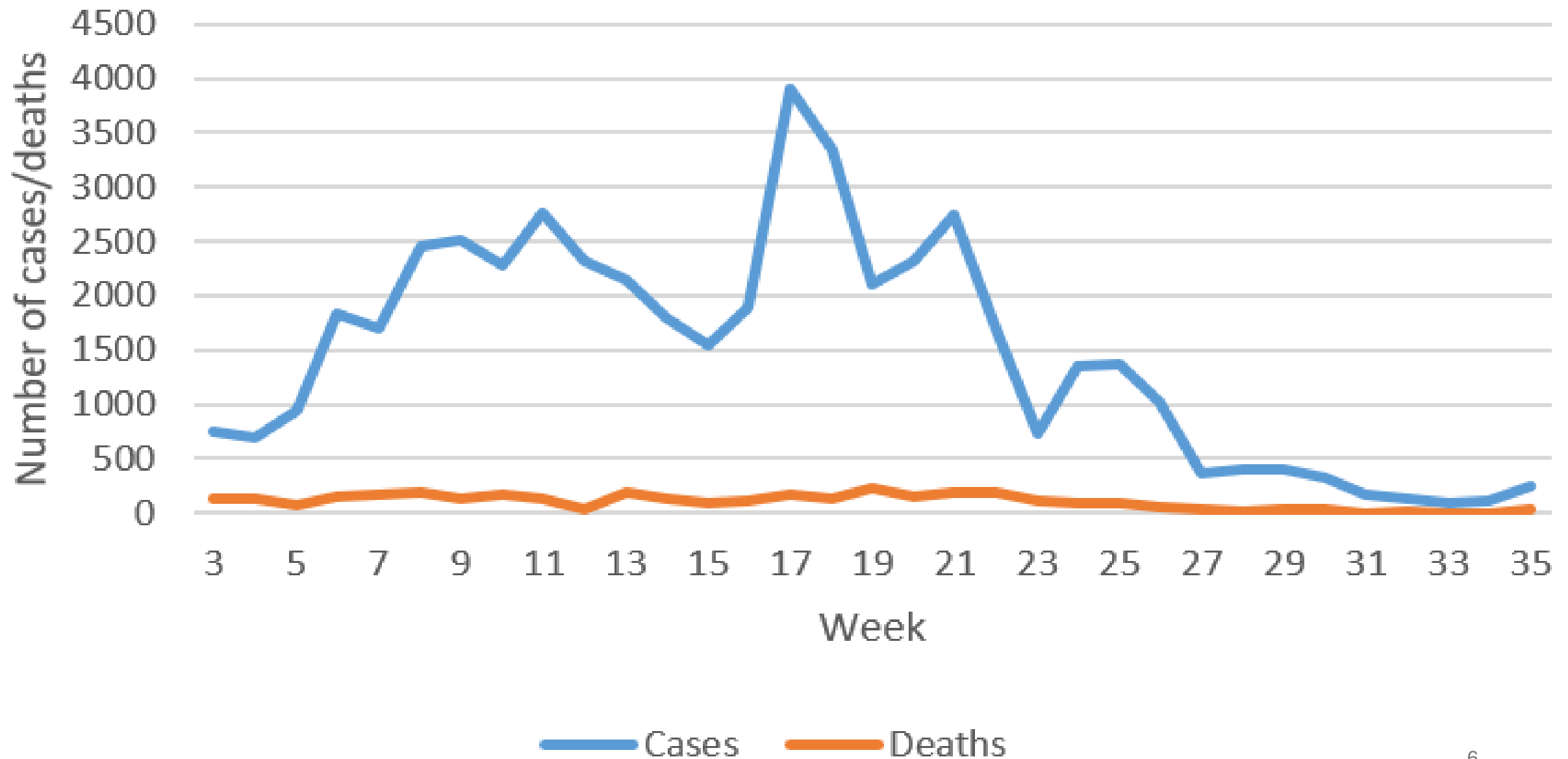
Lumpy skin disease cases were highest in the Masvingo District.

The DVS is urging farmers to vaccinate uninfected naïve populations immediately to curb the spread.

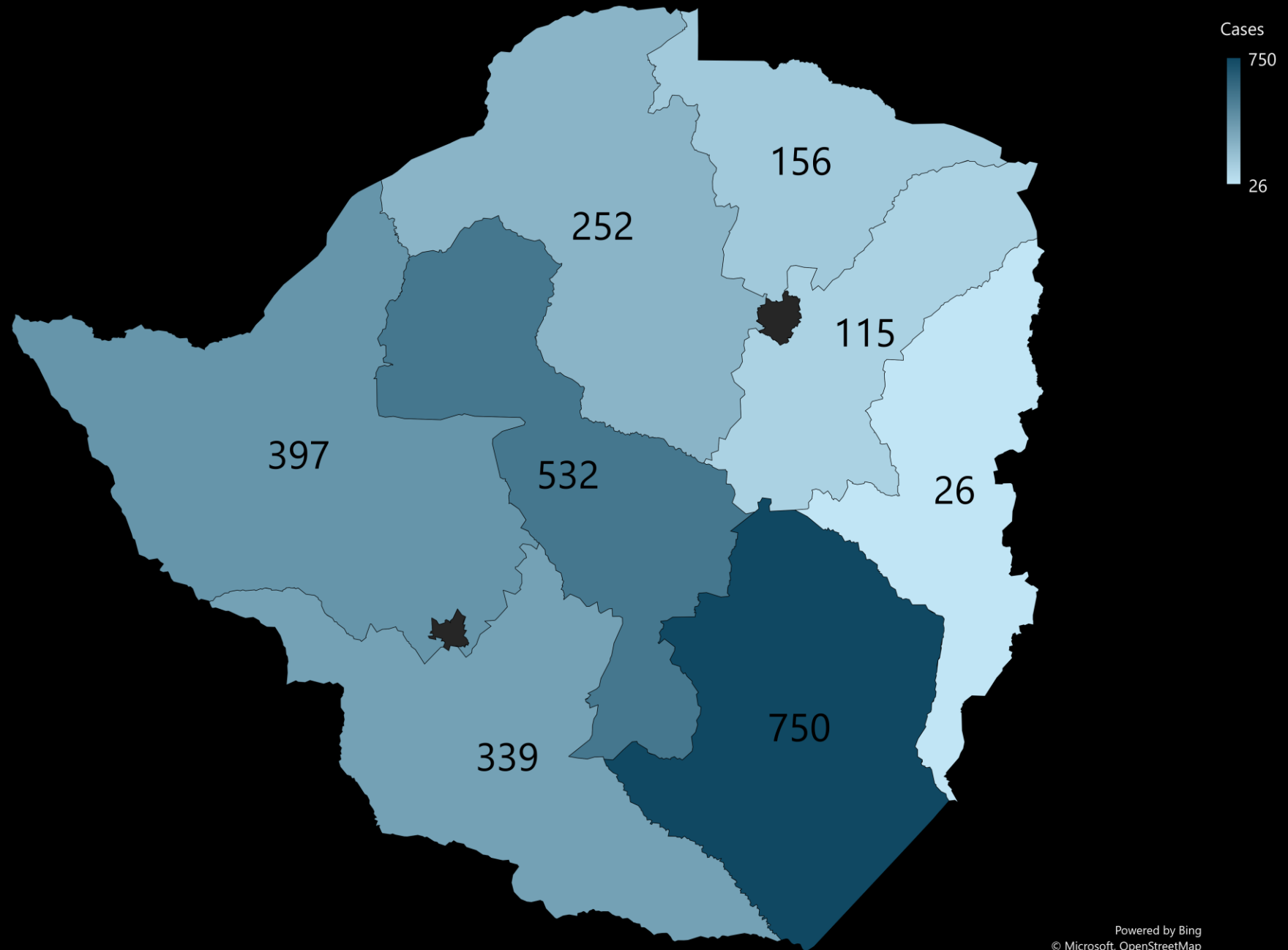
National Overview: A total of **47,563 cases and 3,371 mortalities** were recorded

Province	Cases	Deaths	Cumulative Cases	Cumulative Deaths
Mashonaland West	34	3	3994	551
Masvingo	9	0	16262	691
Mashonaland Central	14	0	2713	82
Matabeleland South	1	1	5615	805
Midlands	1	0	5231	481
Matabeleland North	0	0	4035	378
Mashonaland East	1	0	6098	155
Manicaland	11	0	3615	228
Total	71	4	47563	3371

LSD cases and deaths 2026

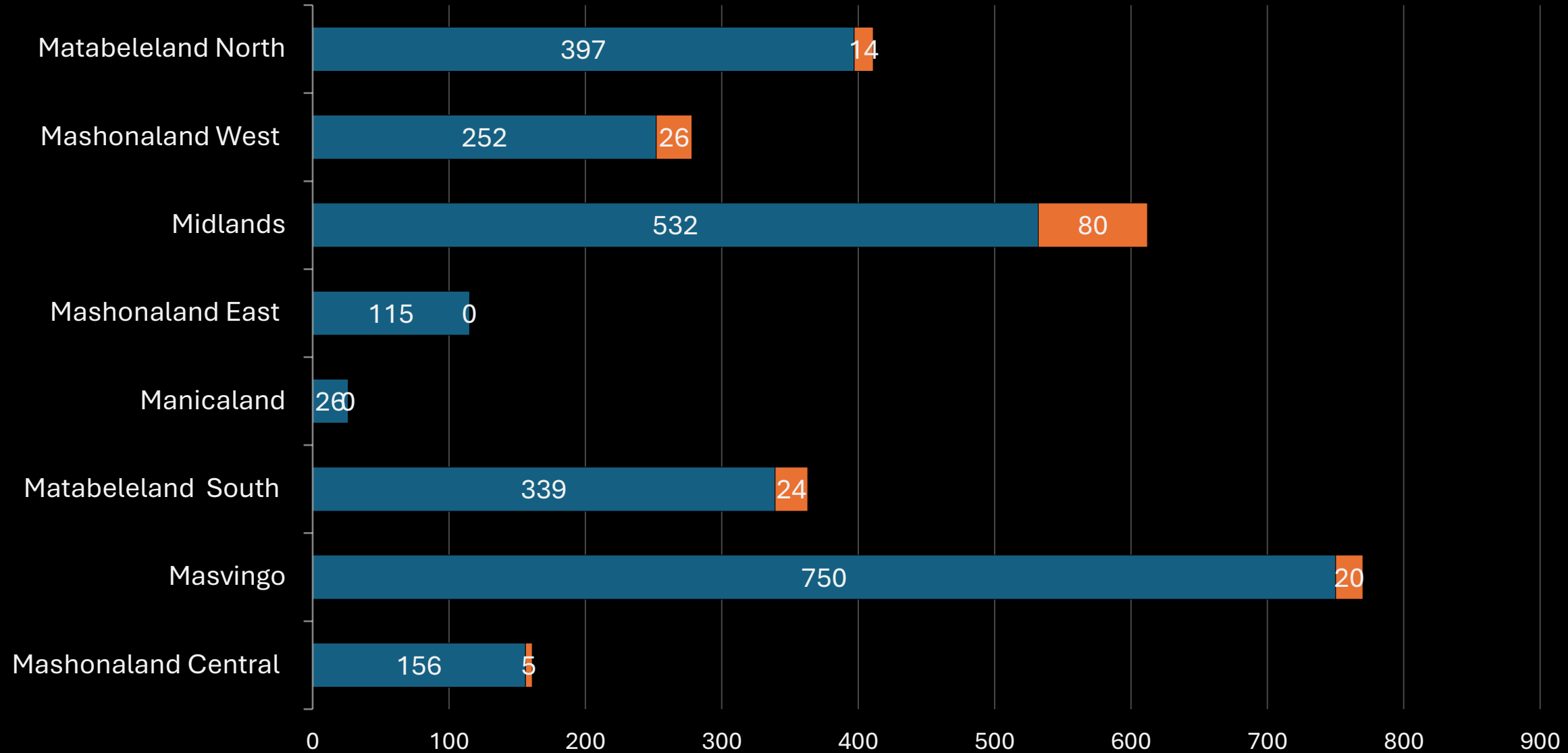


Lumpy skin distribution by province



Lumpyskin distribtion by province

Cases
Deaths





Lumpy skin disease situation

Fatality Rate: Currently stable at 7%, largely due to ongoing treatment efforts by farmers and DVS extension staff. High fatalities are primarily seen in calves suffering from complications with secondary bacterial infections

Masvingo Province: Reports the highest incidence nationwide, with Mwenezi and Masvingo districts identified as hotspots

Other Regions: New cases persist in Mhondoro

Ngezi and Sanyati (Mashonaland West), while Gokwe South remains the most affected area in the Midlands Province

Rabies

Rabies remains a significant public health and veterinary concern in Zimbabwe, with cases persisting in jackals, dogs and cattle populations nationwide.

Notably, there has been a recent surge in reported cases within urban centres

The DVS has just received 650 000 doses of the rabies vaccine which is enough to cover beyond the DVS target of 500 000 dogs per year.

Mass rabies vaccination campaigns will be carried out countrywide starting from this week .

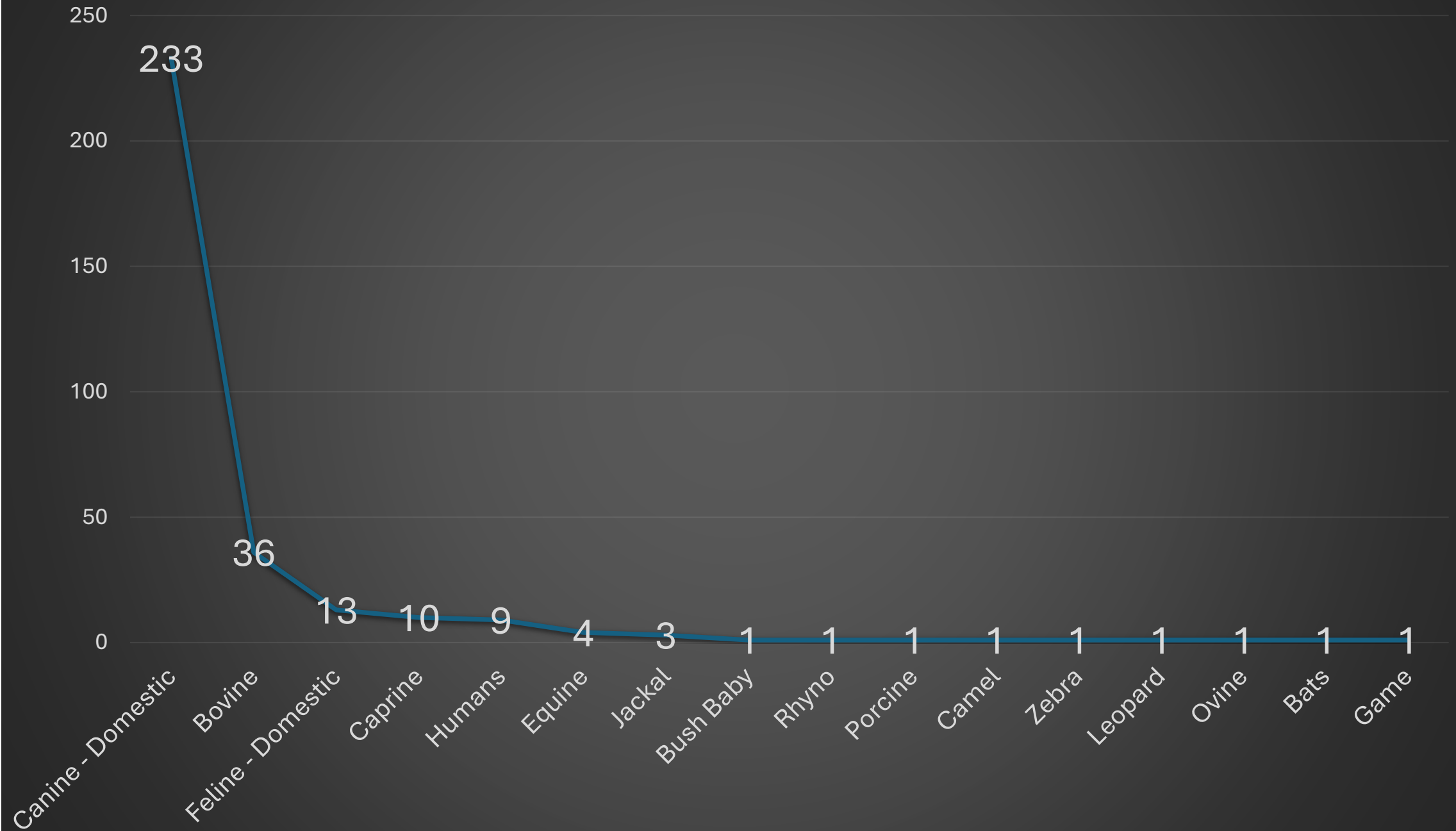
The rabies challenge is being exacerbated by stray dog population in most urban settlements where dogs freely roam in the streets and scavenge during the night .

These dogs are not vaccinated during routine vaccination campaigns and act as key reservoirs of dog mediated rabies in most settlements .

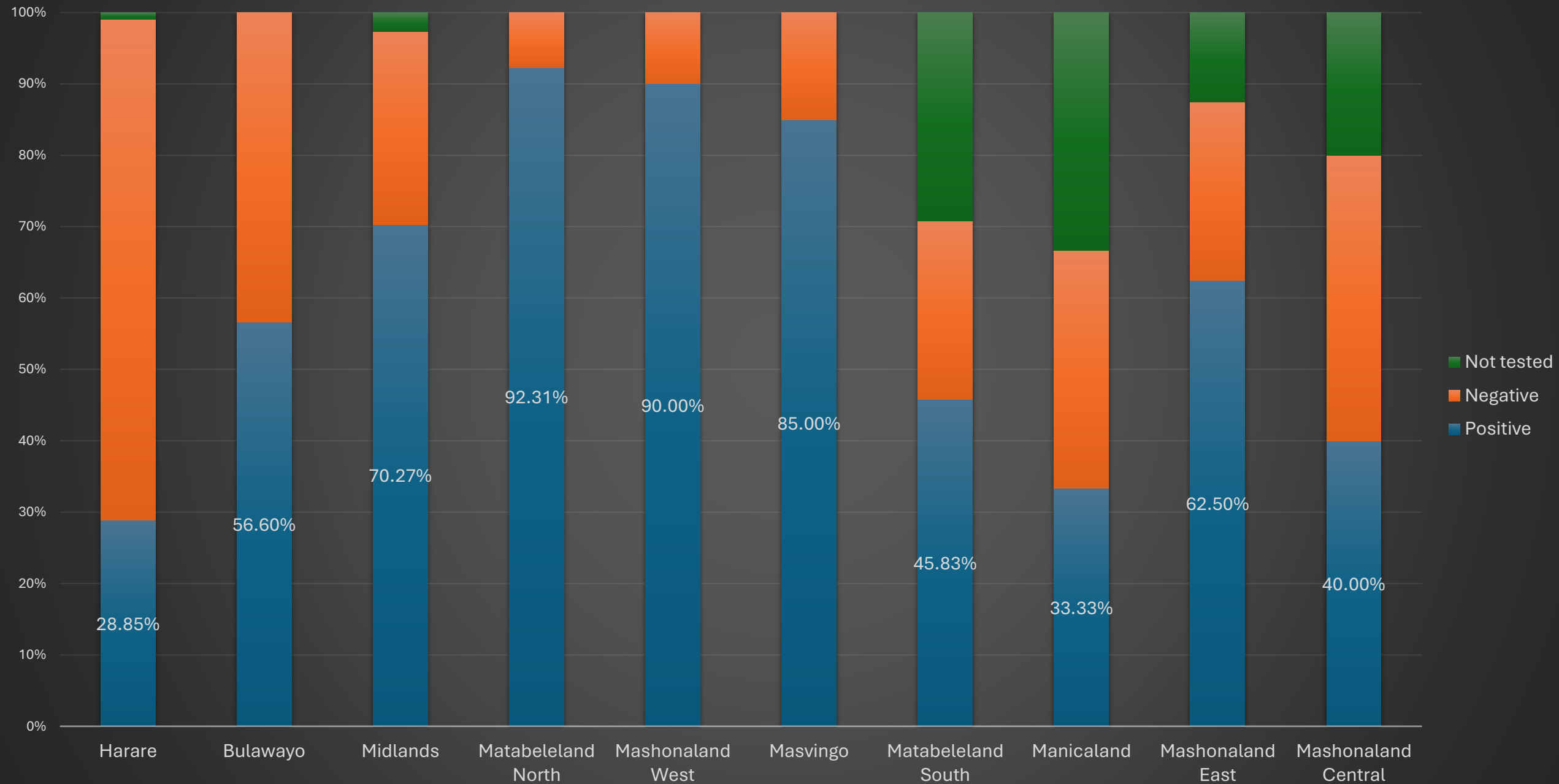
The DVS has teamed up with local authorities to enforce council by laws and encourage residents to have responsible pet ownership . Spay and neuter campaigns are needed in most urban centres to reduce control dog ownership

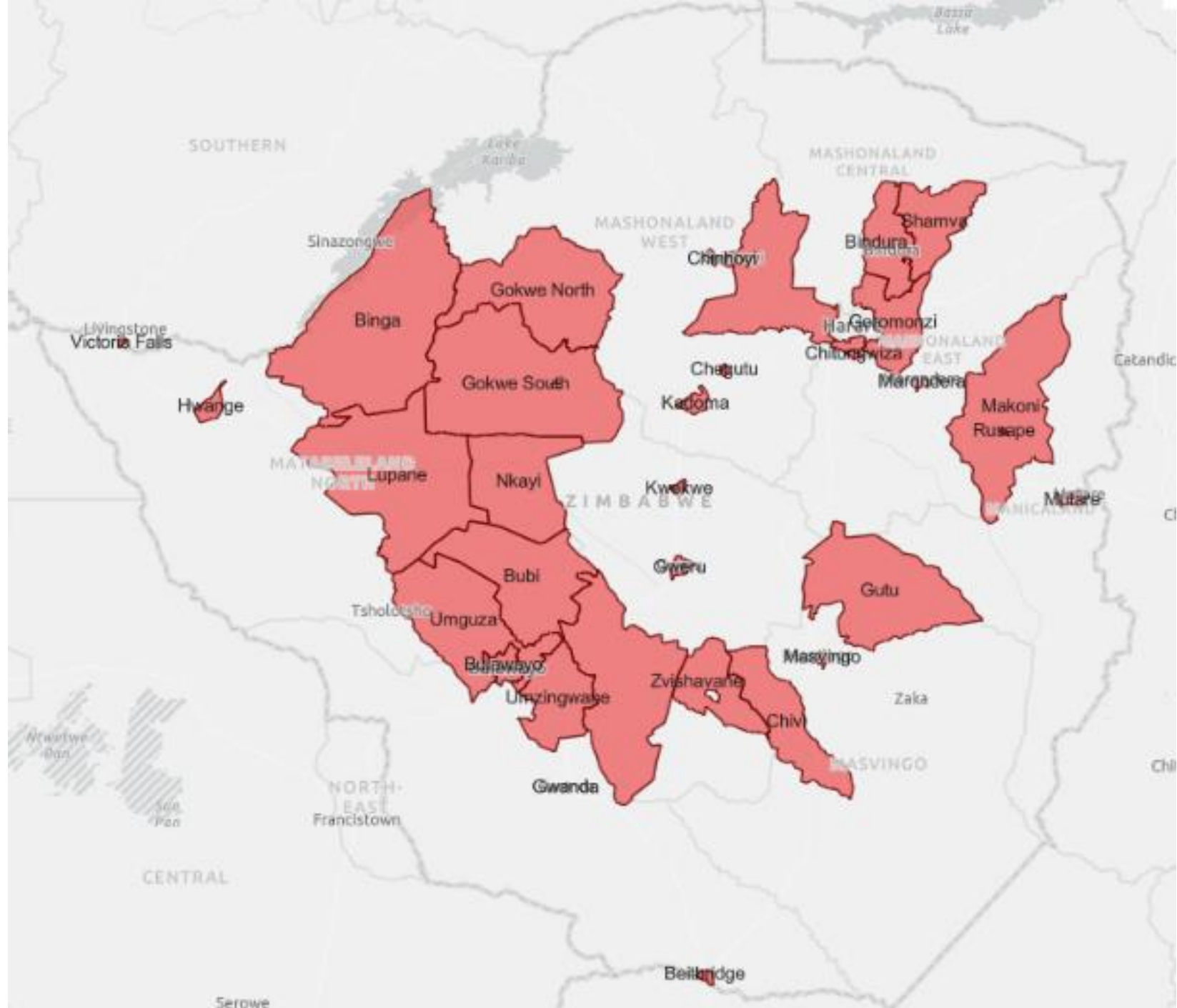


Species Distribution of samples tested in 2025



Provincial Rabies Results Distribution





Rabies

Bulawayo city has recorded most cases with Matabeleland North and Mashonaland West reporting the most cases .

Vaccination campaigns are meant to cover at least 70% of the dog population for the rabies incidence to be reduced .

In 2025 317 samples were sent to the CVL for testing with 170 samples being positive .

The target in 2026 is to reduce the rabies incidence by 50 % through strategic vaccination and extensive awareness campaigns .

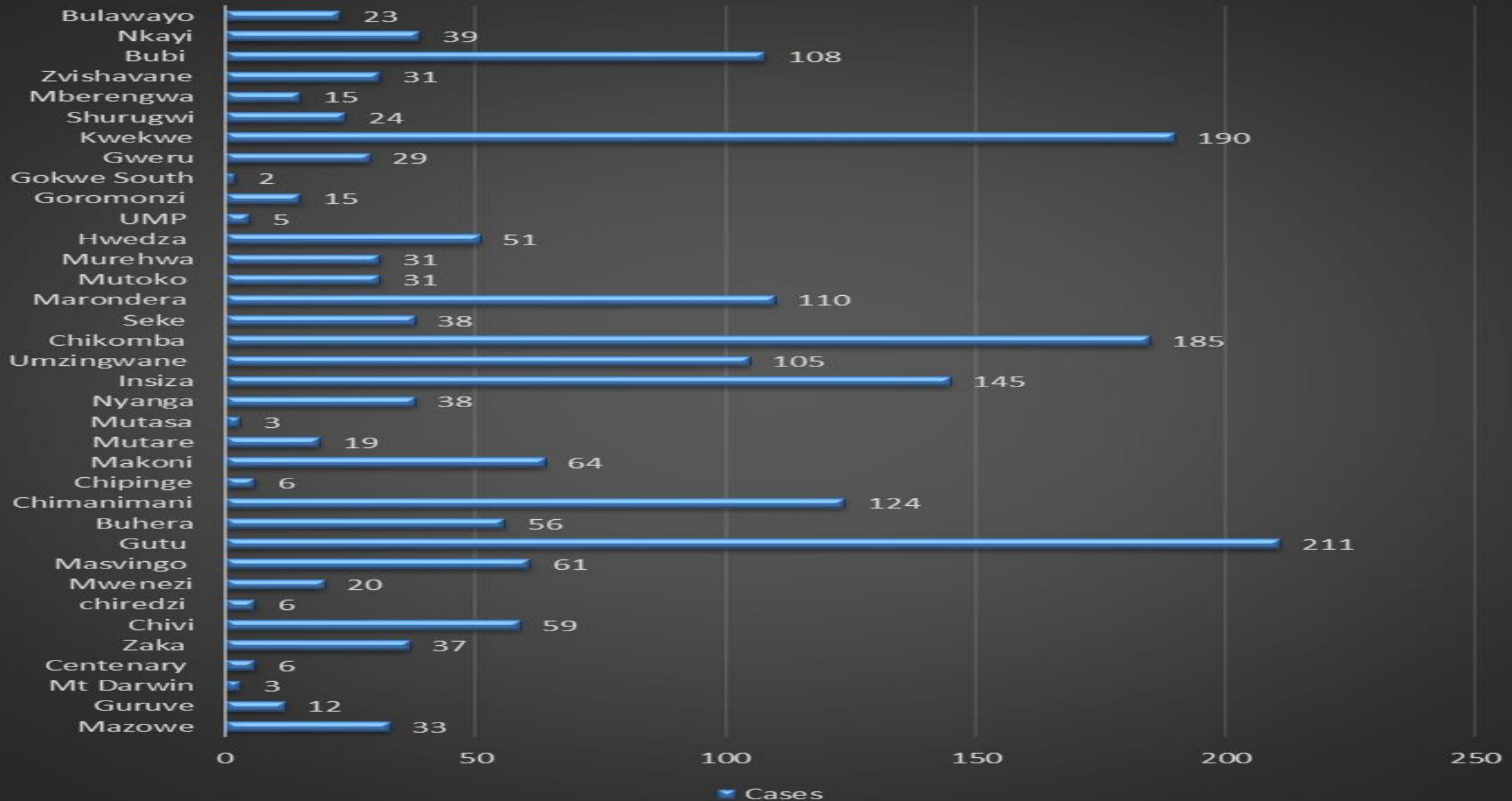
Partnerships with stakeholders remains critical in rabies control with continuous engagement set on the cards



Tick Borne Diseases Risk (TBDs) Update

- National surveillance data indicate a slight increase in Tick-Borne Disease (TBD) cases across the country , with significant clusters emerging in Masvingo and Mashonaland East provinces.
- Masvingo Province: A high concentration of cases is noted in the Gutu District. In response, the province received 990kg of acaricide this week to initiate immediate dipping interventions
- Mashonaland East: A surge in cases has been recorded in the Chikomba District, which borders the affected Gutu area, indicating a regional spread that requires urgent containment.
- Midlands & Matabeleland North: New cases continue to be reported in the Kwekwe District, while the Bubi District in Matabeleland North has also emerged as a zone of concern

Theileriosis cases recorded during week ending 6 Feb



Tick-borne disease cases and deaths

Weekly surveillance, 2026 • Two sharp case surges dominate the early-year pattern



Source: supplied chart image. Weekly values were digitized and rounded; use the original dataset for exact reporting.



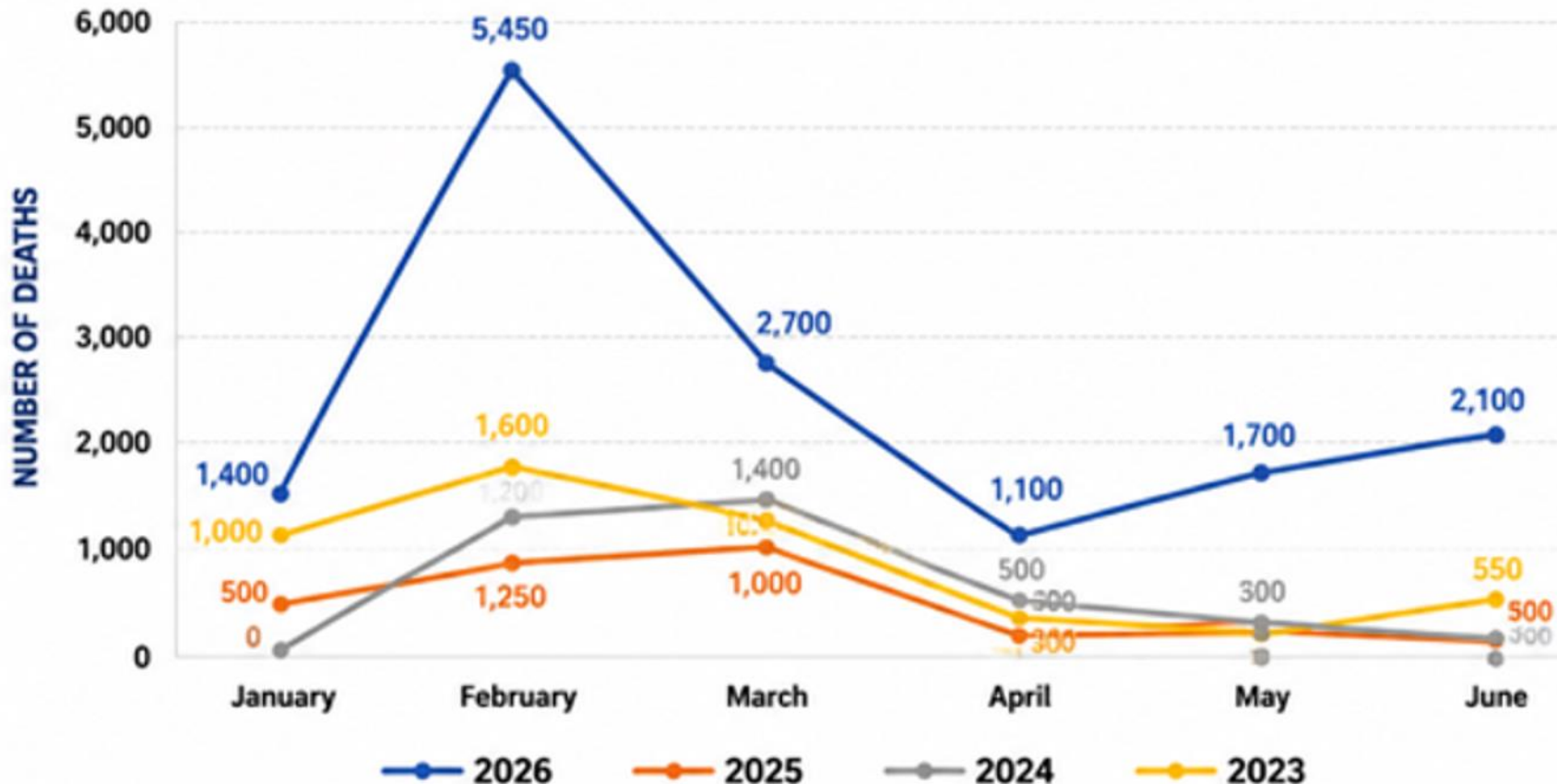
TICK-BORNE DISEASE (TBD) DEATH TREND

2023 – 2026 | JANUARY – JUNE

Comparing monthly TBD deaths from January to June over the past four years to identify trends and inform control strategies.



MONTHLY TBD DEATHS (2023–2026)



KEY INSIGHTS



2026 EARLY SURGE

Deaths in 2026 peaked sharply in February (5,450), the highest recorded in the past four years.



DECLINING TREND AFTER PEAK

From March to April 2026, deaths dropped by 59% (from 2,700 to 1,100), showing a significant decline after the peak.



2026 ABOVE OTHER YEARS

Deaths in 2026 remain higher than 2023, 2024 and 2025 in all months except April.



ONGOING RISK

Deaths increased again in May and June 2026, indicating continued risk and need for sustained control measures.

TOTAL DEATHS (JAN–JUNE)

2026	2025	2024	2023
12,450	3,500	3,750	4,800

CHANGE IN TOTAL DEATHS (2026 vs OTHER YEARS)

vs 2025	vs 2024	vs 2023
+255%	+232%	+159%

HIGHEST MONTH ON RECORD



FEBRUARY 2026

5,450 deaths

Disease	Cumulative Cases	Cumulative Deaths
Theileriosis (January Disease)	37,088	16,033
Bovine Ehrlichiosis (Heartwater)	4,499	1,280
Anaplasmosis (Gallsickness)	5,726	1,516
Babesiosis (Redwater)	3,673	715
Total	50,986	19,544

Thank you

Beefing up skills-raising the steaks with adapted cattle

-Adaptability

“To thrive not just survive”



2. Stocking Rate Drives Profit

- Stocking rate is driven by adaptability.
- Fertility –the “Tool”to measures adaptability.
- Fertility is driven by body condition and hormonal balance
- Both dependent on nutritional adaption and environmental adaption



3. Improving Genetics

- Identify the best animals.
- Multiply superior genetics.
- Not by culling ,but by identifying.
- Selection by outcome and not prediction.
- Advance genetics by using better bulls.



4. Practical & Functional Selection

- Hormonal balance!! Male /Female (Absolute Dimorphism)
=Exact opposite
The most masculine bulls breed the most feminine cows (Visa).
Bull growth testosterone(muscle)
Female estrogen (fat)



Father and Daughter

5. Bull Characteristics

- A bull should look, act and 'talk' like a bull from very young.



6. High Fertility Bull

- Visual characteristics of high fertility in a young bull (Indication of potential performance).
- Visual characteristics of high fertility in matured cow (Indication of reproductive history).
- Low fertile 'Looks' in cow (over supply of energy)
 - Open cow
 - Dead calf
 - Low milk
 - High energy diet
- Heifer Visual selection (60% accurate)
 - Vulva and udder development
 - Hair Coat + Glands (Whorl)
 - Reproductive tracking

“Cow must produce meat not necessarily carry meat”



20/05/2026 17:28



















7. Key Take-Home Messages

Desirable Phenotype

- Head and Muzzle
- NECK AND SHOULDERS!!!
- Wedge Shape (Side top and rear)
- Reproductive organs

Note : Both sexes exhibit same survival characteristics

- Muzzle
- Shiny Coat summer
- Athletic and functional movement
- Hoof “Growth”





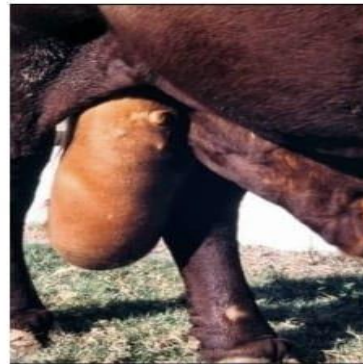




8. Important Measurements

- Relative growth!
- Relative scrotum.

**Importance of scrotum
shape and “substance”!!**



9. EBV??

‘Different environments require different phenotypes’

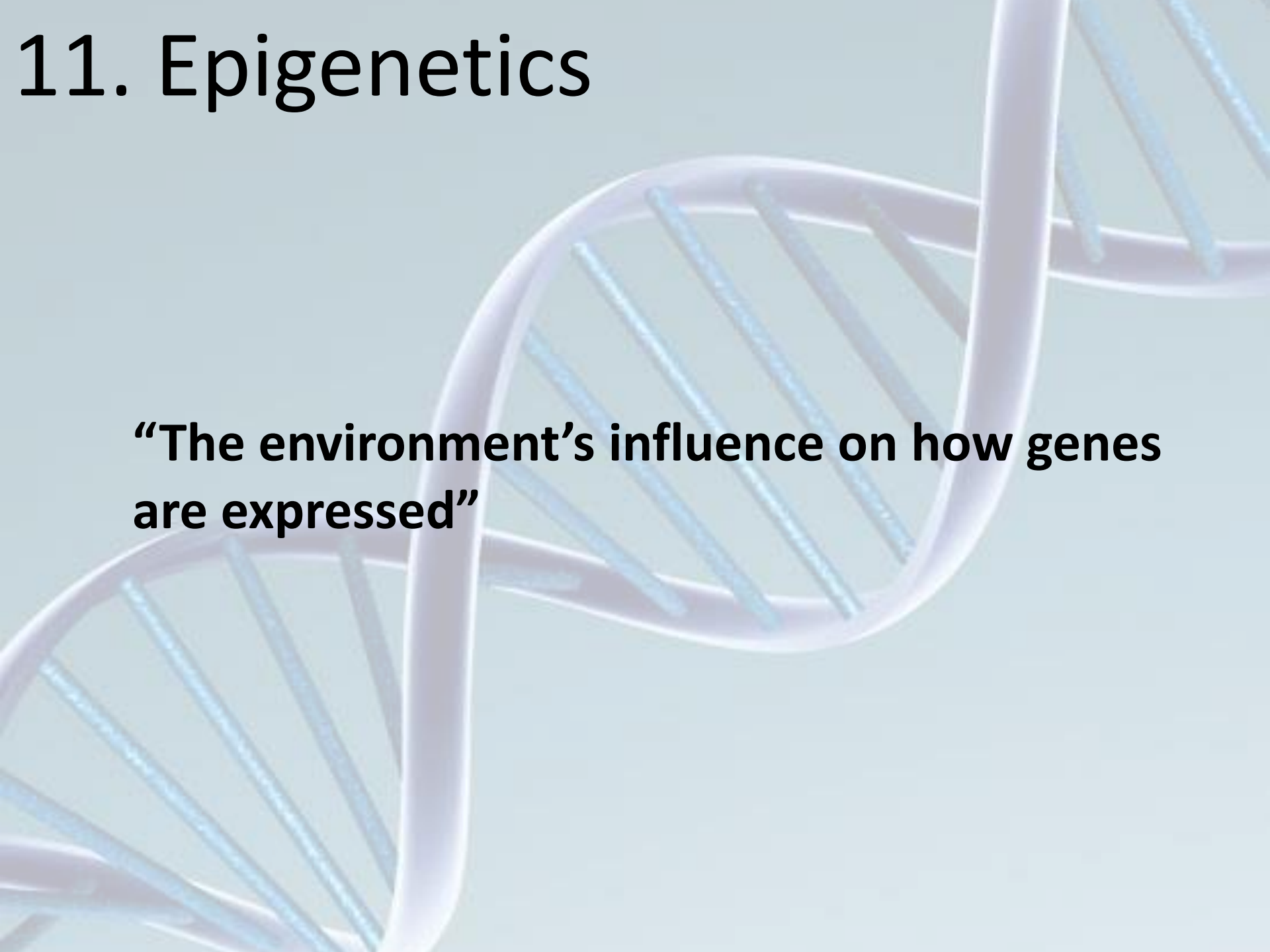
- All Traits select against underperformance apart from Fertility traits
 - Birth Weight / Calving problems
 - Milk / To low milk
 - Growth / non growers

10. Importance of Calving Ease

- Myostatin **xxx**
- Low temperature.
- Unfit.
- High-energy diet.
- Flat rump (posted legs)
- Heifer bulls **xxx**



11. Epigenetics



“The environment’s influence on how genes are expressed”

11. Practical Bull Management

- Veld – Raised
- First selection / 12 – 14 months
- Single sire mating **xx**
- Identify alpha male
- **When in doubt trust nature!!!**





Red Meat Road Map 2025

- A Global Perspective on Profitable Livestock Production (Challenges and Opportunities)

PJ BUDLER

PJ Budler - Introduction





URUS



SINCE **PJ BUDLER** 1996
GLOBAL LIVESTOCK SOLUTIONS
CONSULTING · GENETIC SELECTION · MARKETING
EVENTS · INTERNATIONAL CATTLE JUDGE



- **References, Mentors and Influences**

Hendrik Joubert

John Phillips

Hal Budler

Philip Barnard

Jan Bonsma

Tom Lasater

Johann Zietsman

Ryan Topp

Johnny Clegg

Kris Kristofferson

Christopher Hitchens

Yuval Noah Harari

Bjorn Lomborg

Alex Epstein

Sam Harris

Douglas Murray







The real heroes!



1-2% Feeds 100%

Decentralize Power

National Security

The Human Flourishing Value Chain

PRESERVE
PERSEVERE
PRODUCE
PROFIT
PROSPER





8 Divisions of a cattle operation

Genetics – Herd Management – Nutrition – Animal Health
Marketing – Record Keeping – Forage Management – Human Resources

Adaptability – Functional Efficiency - Fertility – Longevity

Most
important
economic traits
in a cattle
operation



Growth – Muscle – Milk - Marbling



Adaptability

70% OF THE WORLD'S CATTLE ARE IN THE TROPICS

What % R&D in NA & European goes towards Tropically Adapted Cattle





TROPICAL ADAPTABILITY

1. Body Type
2. Hide Color
3. Slick Coat
4. Subcutaneous Muscles
5. Sebum Excretion
6. Surface Area of Hide/Additional Sweat Glands



Functional Efficiency

Physiology and Endocrinology



- **Fertility**

- 5 x more important than growth

- High Heritability

- High Inherent Body Condition +
Hormonal Balance = Fertility

- Select FOR Fertility

Longevity





**Sexual Dimorphism
vs
Sexual Monomorphism**



**Growth Hormones
vs
Sex Hormones**





Growth (Weight)



Muscle



Milk



Marbling

What size should a cow be?

1. Appropriate Nutrition and Management
2. Calve by 27/36 months
3. Conceive in a 45/90-day breeding season
4. Do this annually and on time
5. Establish a minimum weaning weight at 7 months
6. Calf must be at least 45% of the cow's weight at 7 months
7. Do this every year and within 4-5 years, your cows will be the right size for your environment, resources and objectives



Linebreeding

Highly strategized
inbreeding



Evaluating Structure and Phenotype

- Eat, Walk and Reproduce
- Focus on the 4 most important economic traits (Fertility, Longevity, Adaptability, Functional Efficiency)
Then build on that foundation with the next 4 (Growth, Muscle, Milk, Marbling)
- Quality cattle come in all different shapes, sizes and colors. Its easy to make a big one or a small one, a black one, a white one or a red one. The art of breeding lies in making a good one. Make sure that the good one fits your environment, resources and objectives

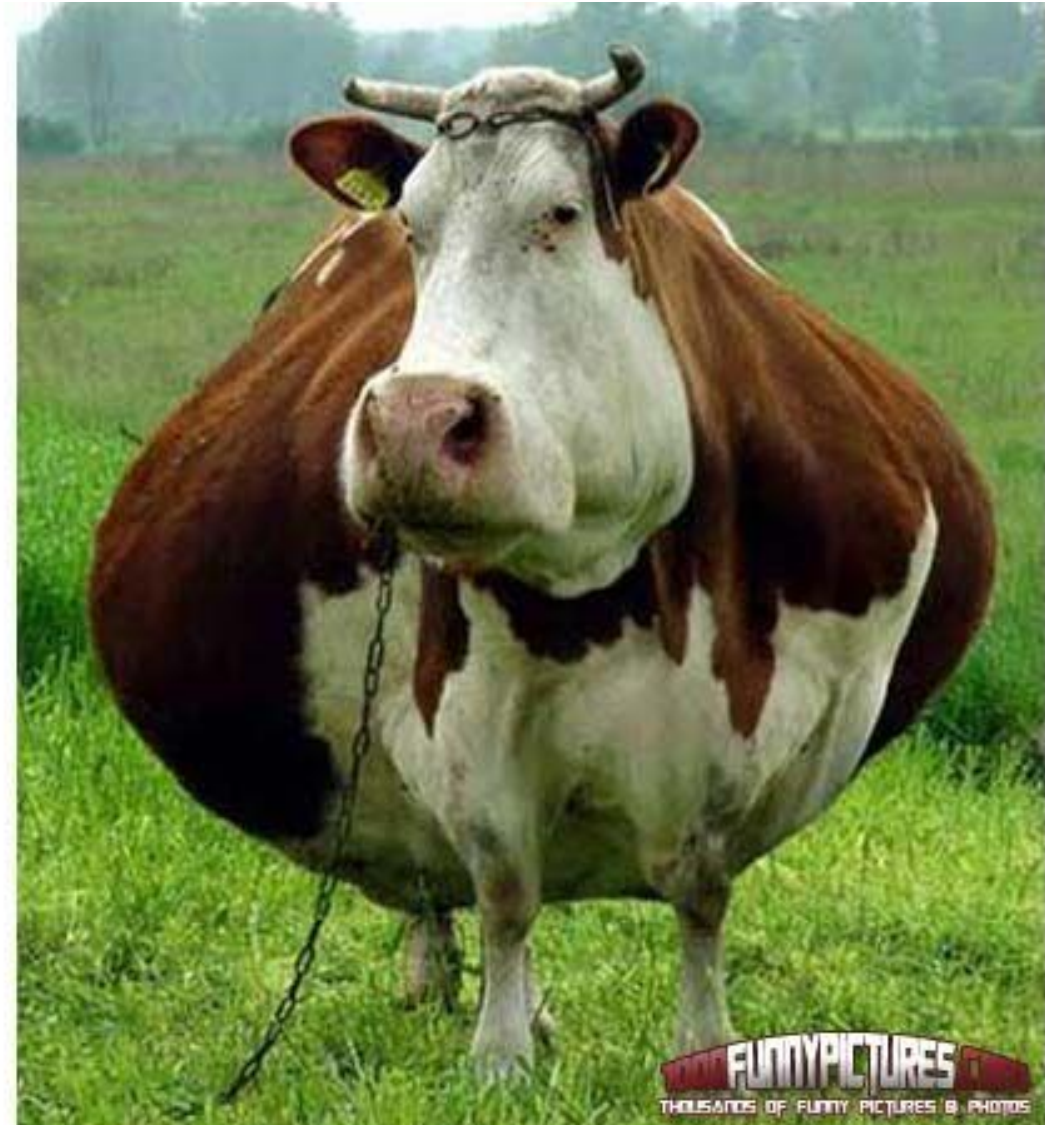


FAT (Inherent Body Condition)

Good, bad or ugly?

Positive Correlations:

Maturity Pattern, Fertility,
Temperament,
Foraging Ability, Carcass Quality



Human Flourishing/Well-being

- Free Market Economies
- Maximize Energy
- Liberate Women



10 happiest countries:

1. Finland
2. Denmark
3. Iceland
4. Israel
5. Netherlands
6. Sweden
7. Norway
8. Switzerland
9. Luxembourg
10. New Zealand



Balance

lagom

*Not too little, not too much.
Just right.*

Swedish.

Opportunities

Growing Demand – Limited Resources

- China
- USA (More practitioners/fewer cows)



Humane



Humane & Sustainable



Sustainable

Challenges



Subsidies
(Carbon Tax)



Quotas



Communism



Socialism

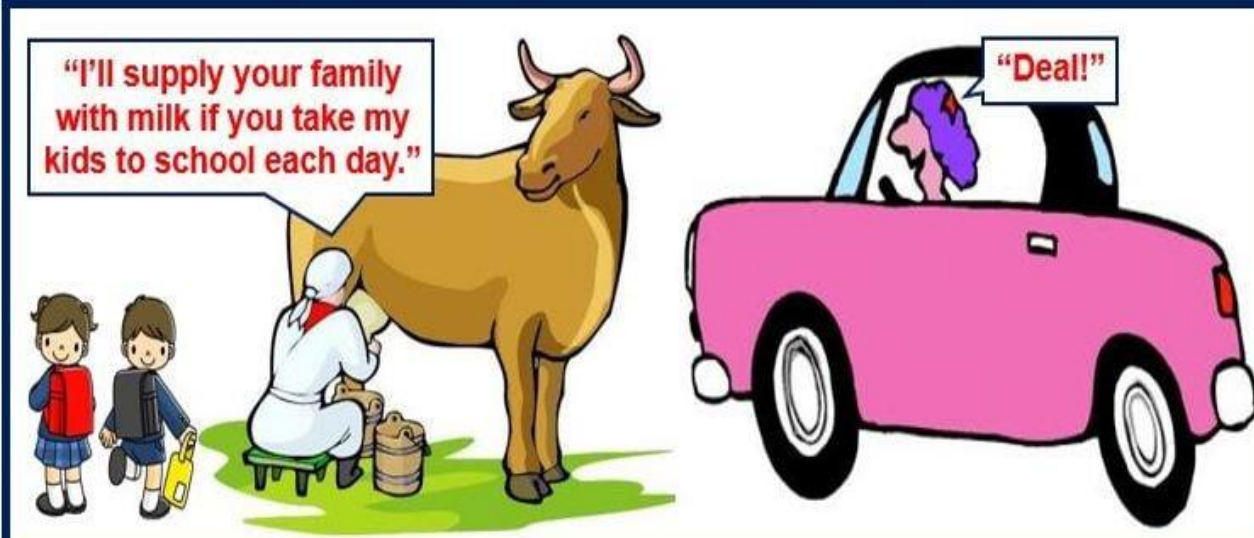
Market Economy

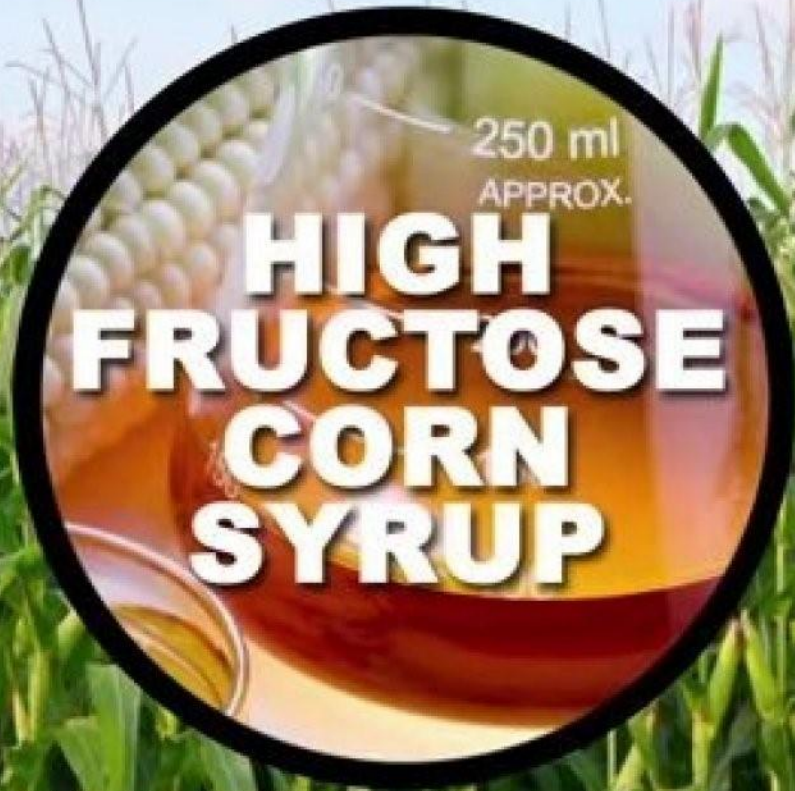
[ˈmɑːr-kæt i-ˈkæ-nə-mē]

An economic system in which economic decisions and the pricing of goods and services are guided by the interactions of a country's individual citizens and businesses.

Free Markets and their effect on Island Nations

Free Market





VS.



OIL & GAS – Cow/Calf Producers - Feedlots – Packers - Retailers

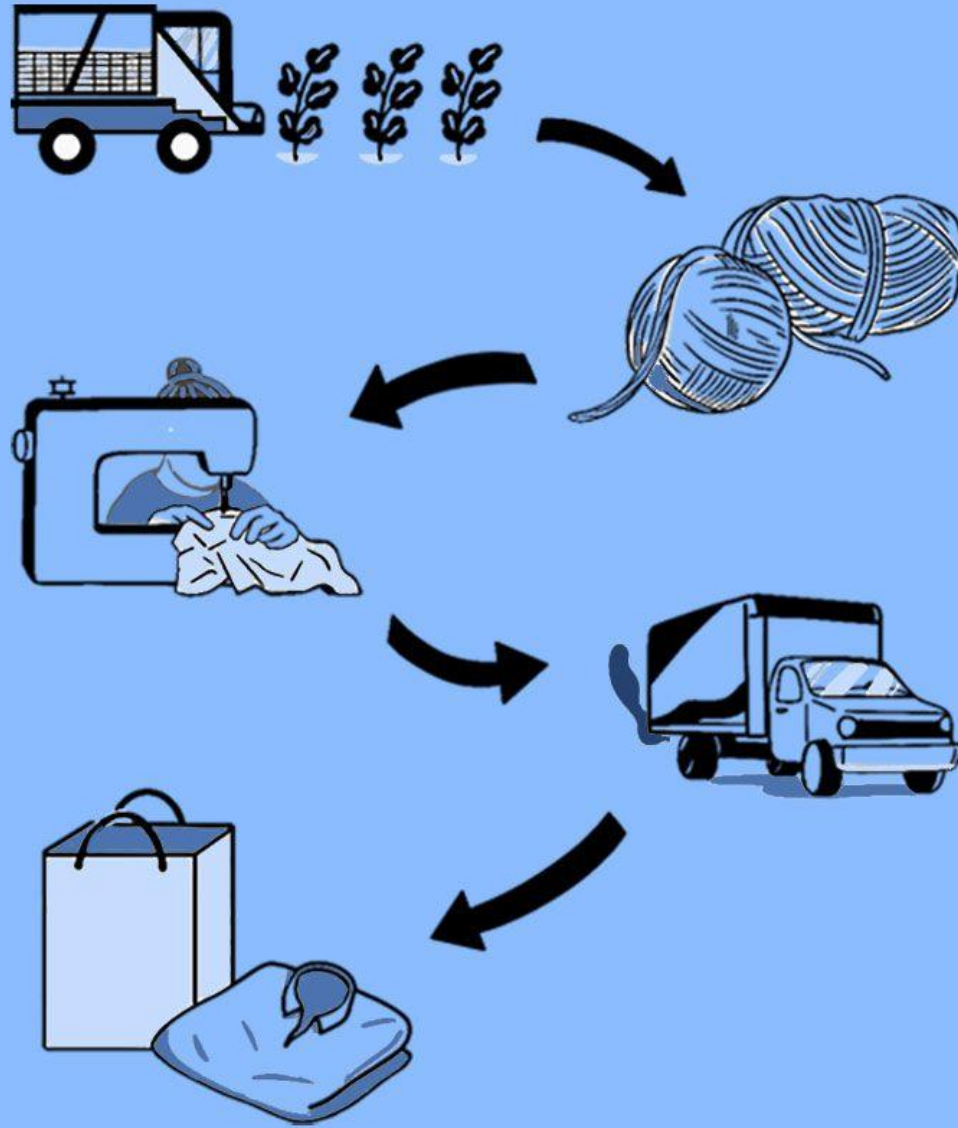




Wars



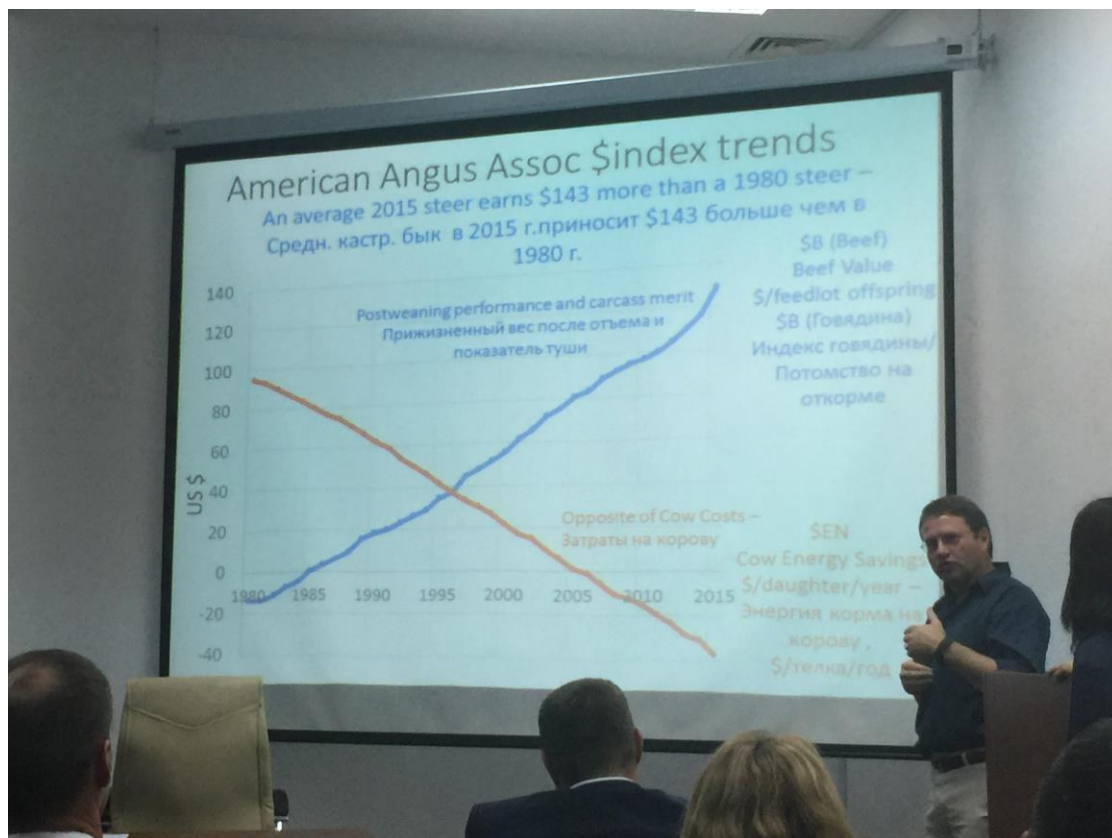
Political Unrest



Value Chain

['val-(.)yü 'chān]

A business model that describes the full range of activities needed to create a product or service.



EPD's & Genomics



Recreation

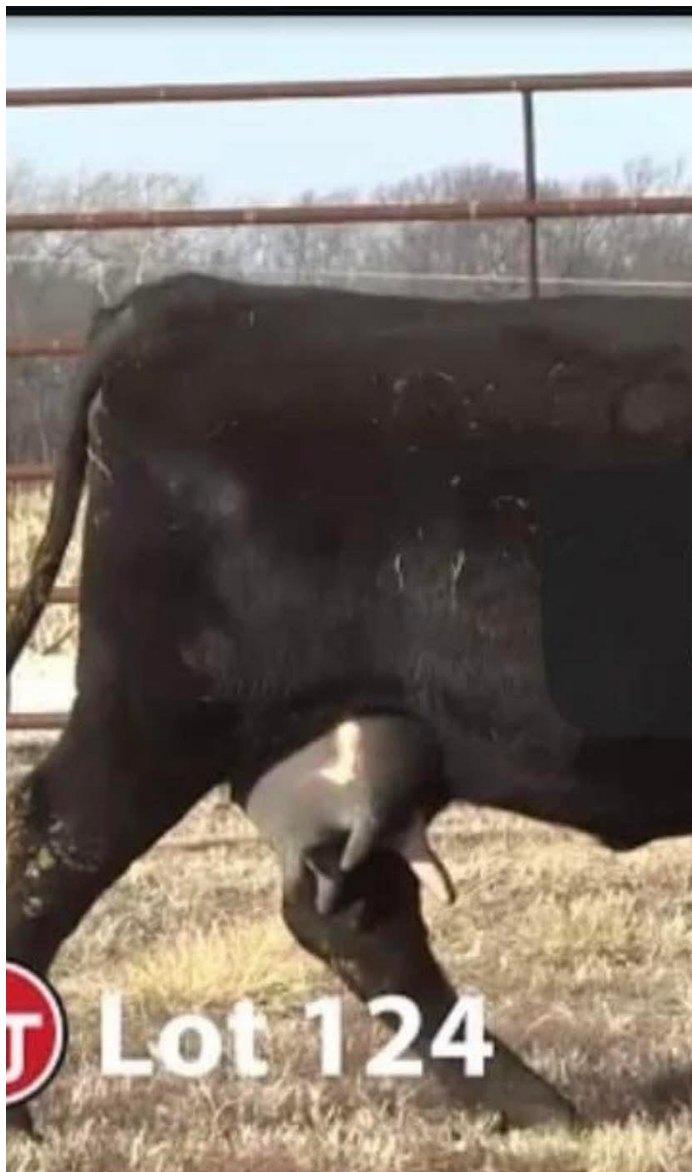


Breeding is an Art and a Science

OR

Breeding is an ART and a \$cience





Leachman ABCs/Indexes

\$PROFIT	\$38,541	Percentile Rank - Top 0.01%
\$Ranch	224	0.07%
\$Feeder	228	0.2%
Feed-Gain	-0.4	<1%
Intake	-15	14%
C. Ease	★★★★★	
Growth	★★★★★	
Maternal	★★★★★	
Udder	★★★★★	
Fertility	★★★★★	
Disposition	★★★★★	
BW	-2.4	3%
WW	49	23%
YW	101	6%
MILK	34	Avg: 22
SC	0.07	90%
HT	0.38	Avg: 0.62
MAT WT	17	Avg: 28
REA	0.85	45%
IMF	0.82	2%
CAR WT	60	<1%
BF	-0.03	30%
PAP	-0.06	

Born: 2/3/22
Breed: 64B 36C
Homozygous Polled
Homozygous Black
Cane Code: 704XB171

Hook's Capitalist 37C
Sire: Leachman Heritage S122H
GRU Stabilizer DX140
Leachman TL BottomLine G385E
Dam: GRU Stabilizer HS073
GRU Stabilizer FS976

Leachman **Kadoka** S717K



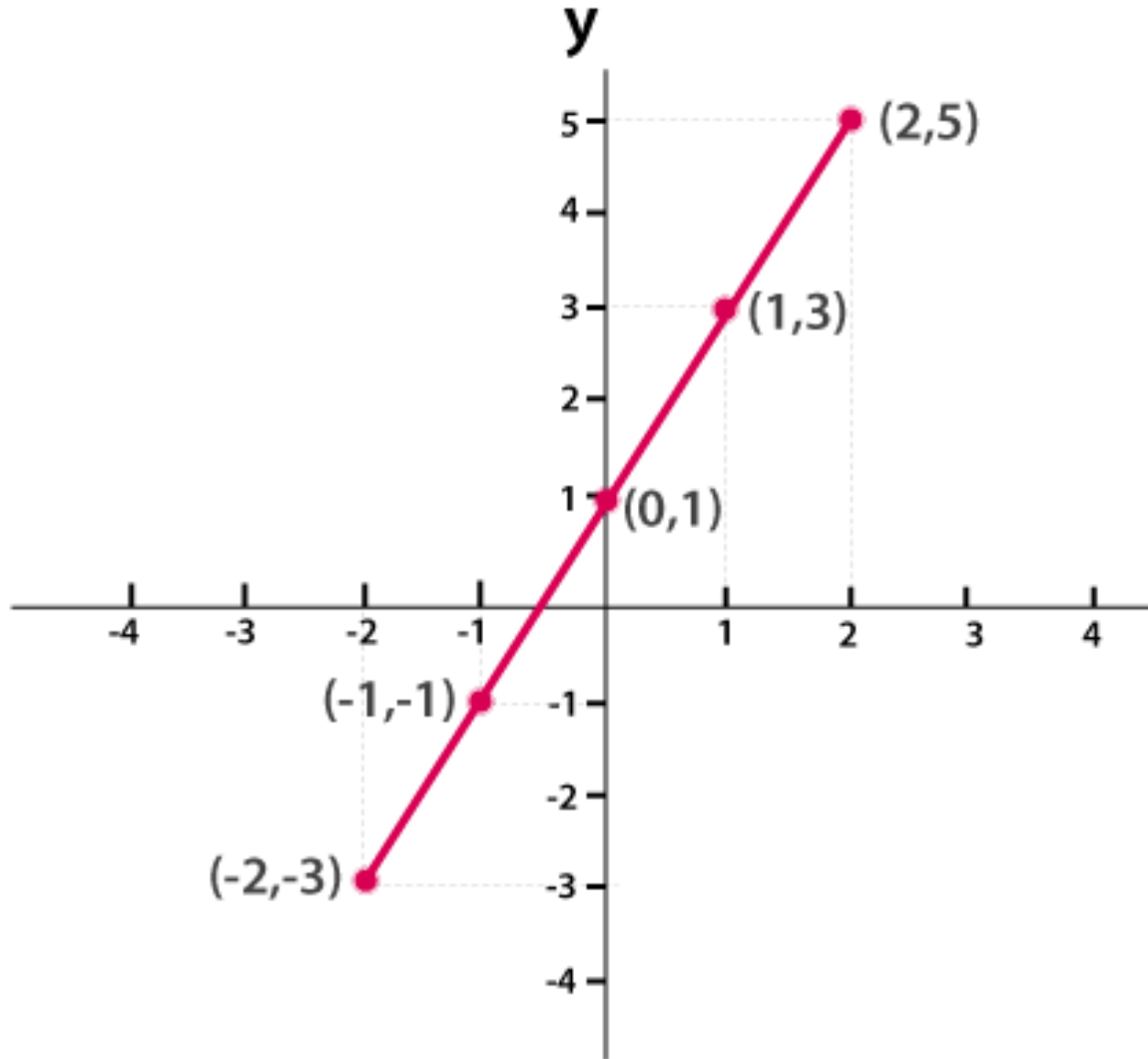
- Introducing a new level of \$Profit and a level of \$Ranch that many thought would never be attainable.
- A true genomic giant, this Capitalist grandson presents an ABC profile that leaves nothing left to be desired! From calving ease to maternal excellence and fertility, feed efficiency to carcass merit- Kadoka moves the needle for every measurable trait you can imagine!
- He is the second highest bull in our line-up for both \$Profit and \$Ranch!

☆☆☆☆☆
Five-Star
ALL-AROUND

\$30/unit

Owners: Leachman Cattle, Grubl Ranch, Marc & Debbie Rieger

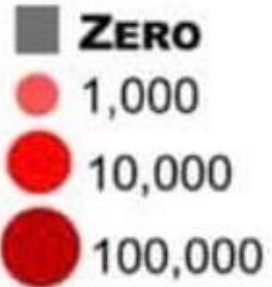




DEATHS FROM GMO CONSUMPTION

OVER THE LAST 30 YEARS BY COUNTRY

CASUALTIES BY COUNTRY



Source: GMOANSWERS.COM

MATTHEW POT



THE FOSSIL FUELS

oil



natural gas



coal





Manhattan, NY



Manhattan, KS

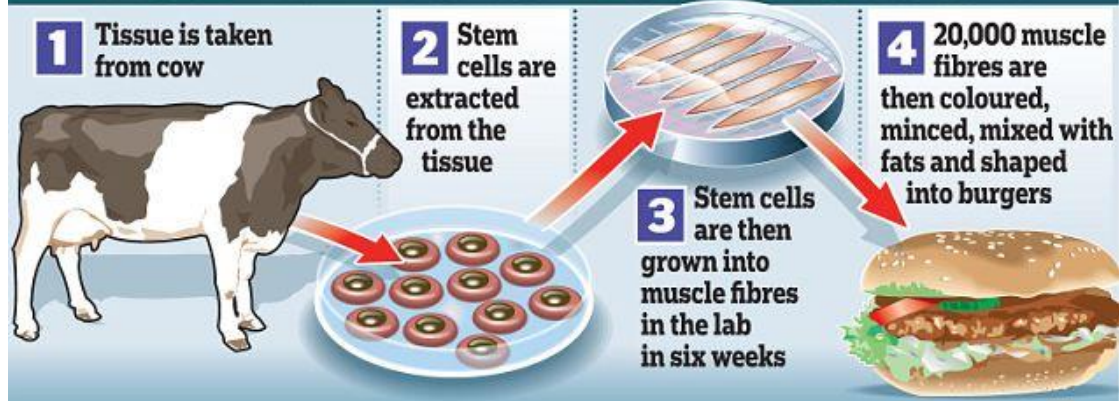




Religion & Politics



HOW THE BURGERS ARE GROWN



A vegan diet kills a lot of animals!



More Cows/Less Cows

More Energy/Less Energy



Climate & Environment - Context and Nuance
Minimal Human Impact vs Human Flourishing



Major Grasslands of the world map with names



A photograph of three people in a rural setting. On the left, a man with a beard and a straw hat wears a red and blue plaid shirt. In the center, a young boy in a light blue shirt and dark suspenders stands with his hands on his hips. On the right, an older man with a white beard and a straw hat wears a blue and white plaid shirt and blue jeans with suspenders. They are standing in a field of golden wheat with rolling hills in the background.

Succession Planning

Different areas of focus

Estate Plan

The process of determining a plan to transition financial wealth from one generation to the next.

- What you **have** – Assets
- Easy to identify (balance sheet)
- Solved by an expert
- Responds to compliance/gov't regulations
- Solutions implemented quickly
- Involves **financial** ownership
- Determined by senior generation
- Activities occur at set times
- Major transition often occurs at death
- Opportunity for conflict limited time
- In-laws generally “passive” recipients
- Strategy tends to be clear

Succession Plan

The process of “co-creating” psychological ownership of the vision, strategy, goals, roles, decisions, performance and results of the business enterprise between two or more generations.

- What you **do** – Skills, Activities, Decisions
- Hard to clearly describe...lots of hats
- Solved by you, assisted by advisors
- Involves business environment, strategy
- Solutions evolve over time
- Requires **psychological** ownership
- Collaborative between generations
- Takes place daily in the business
- Major transition occurs during lifetime
- Opportunity for conflict every day
- In-laws often “active” voices
- Strategy can be very messy



60% of the world's cattle population
is in these 5 countries



TOP 5 COUNTRIES BY CATTLE INVENTORY

1. India – 308 million
2. Brazil – 194 million
3. China – 102 million
4. USA – 89 million
5. Ethiopia – 70 million



NO. 1 BEEF PRODUCER IN THE WORLD

USA



Every country in the world
either has cattle, eats beef or
does both



Phenotype vs Genotype?
The most important selection tool

Phenotype
Estimated Breeding Values/Estimated Progeny Differences
In-herd Indexes
Pedigree
Raw Data
Genomics



Eat, Walk, Reproduce



Udder Quality



What's in a head?





Feminine Wedge Shape when analyzing body dimension



Maternal and Terminal Body Types



Temperament is an economic trait





Hide color and its effects on Infra-red and Ultra-violet rays



Hair coats in summer and winter

Pigmentation



It all
correlates





Balance



- Contact Information

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Texas 76147
USA

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WhatsApp: +1 682 597 0380
Email: pj.budler@transova.com





Zimbabwe Herd Book (ZHB) Beef School

- Boran – The Mother Cow of Africa

PJ BUDLER

Most
important
economic traits
in a cattle
operation

Environmental Adaptability
Nutritional Adaptability
Functional Efficiency
Fertility
Longevity
Calving Ease





Environmental Adaptability

70% OF THE WORLD'S CATTLE ARE IN THE TROPICS

What % R&D in NA & European goes towards Tropically Adapted Cattle





TROPICAL ADAPTABILITY

1. Body Type
2. Hide Color
3. Slick Coat
4. Subcutaneous Muscles
5. Sebum Excretion
6. Surface Area of Hide/Additional Sweat Glands



Nutritional Adaptability



- **Fertility**
 - 5 x more important than growth
 - High Heritability
- High Inherent Body Condition + Hormonal Balance = Fertility
- - Select FOR Fertility

Longevity





**Sexual Dimorphism
vs
Sexual Monomorphism**



**Growth Hormones
vs
Sex Hormones**





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BRIDGING THE GAP

**USING *ALTERNATIVE AND NATURAL REMEDIES*
ALONGSIDE STANDARD VETERINARY MEDICINES
TO KEEP LIVESTOCK HEALTHY**

Jan Myburgh & Doug Bruce

What do we *Normally* have in our Toolboxes?

- **Farmers and veterinarians usually use:**
 - **Allopathic drugs:** normal commercial pharmacological remedies for treatment of farm animals.
- **We need to find new remedies....** Anti-Microbial Resistance (AMR) is becoming a problem.
- **Without the right *tools* in our *toolboxes* -** effective treatment of animal diseases will become more challenging in the future.



Integrative Veterinary Medicine

- New approach to treat animals is called *Integrative Veterinary Medicine*...
- The practice of **combining** *conventional medical treatments* (like antibiotics, NSAIDs, vaccines, etc.) **with** *complementary therapies* (such as phytomedicine, Traditional Chinese Veterinary Medicine, acupuncture, herbal medicine or nutraceuticals).
- The therapeutic approach is ***guided by the best available scientific evidence*** to support farm animal health, production, reproduction and welfare....
- **Phytochemicals**: natural, biologically active compounds extracted from plants...

Phytochemicals / plant chemicals

- **Plants are not mobile.** They can't run away....
- They must be able **to defend themselves against pathogenic microorganisms** (e.g. bacteria, fungi, viruses, etc.).
- **Phytochemicals** have: anti-bacterial; anti-viral; anti-fungal; anti-parasitic and anti-protozoal activity.
- **Plants also have:** anti-oxidant activity; the ability to break up biofilms; tissue healing properties; anti-inflammatory activity; boosting of immunity; anti-stress or anxiolytic properties; and may stimulate tissue healing.
- **Plants differ in the above-mentioned activities.** That is why constant research is needed to identify the best indigenous plants and the best plant combinations. Most often plant combinations are used.

What are the “*Clinical Problems*” that we Need better Tools for?

Production Animals

- The above-mentioned *anti-s*, plus....
- Tissue healing
- Immune system stimulation
- Anti-oxidant activity
- Anti-inflammatory effects
- Biofilm control



Tissue Healing.....



Anti-oxidant Activity

Milk thistle



Angelica Velazquez, Cowlitz County Noxious Weed Control Board

Anti-inflammatory Effects

- Medicinal plants exert powerful anti-inflammatory effects by regulating complex biochemical pathways...

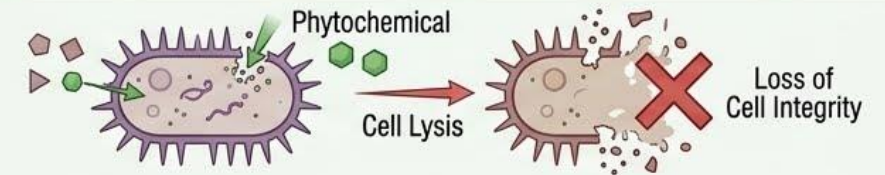
Breaking up Biofilms on Mucous Membranes

- Biofilms act as physical shields that protect harmful microorganisms, allowing them to evade standard medical treatments and the body's natural immune system.
- Phytochemicals can effectively break up and inhibit microbial biofilms.

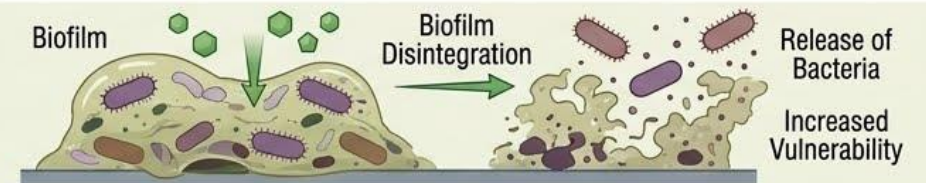
Anti-Bacterial activity of Plants

MECHANISMS OF PHYTOCHEMICAL ANTIBACTERIAL EFFECTS

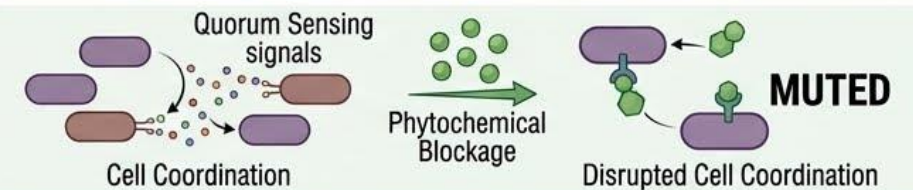
- **1. DIRECT ANTIBACTERIAL EFFECT**
(CELL WALL/MEMBRANE DISRUPTION)



- **2. DISRUPTION OF BIOFILMS**
(BREAKING DOWN PROTECTIVE BARRIERS)



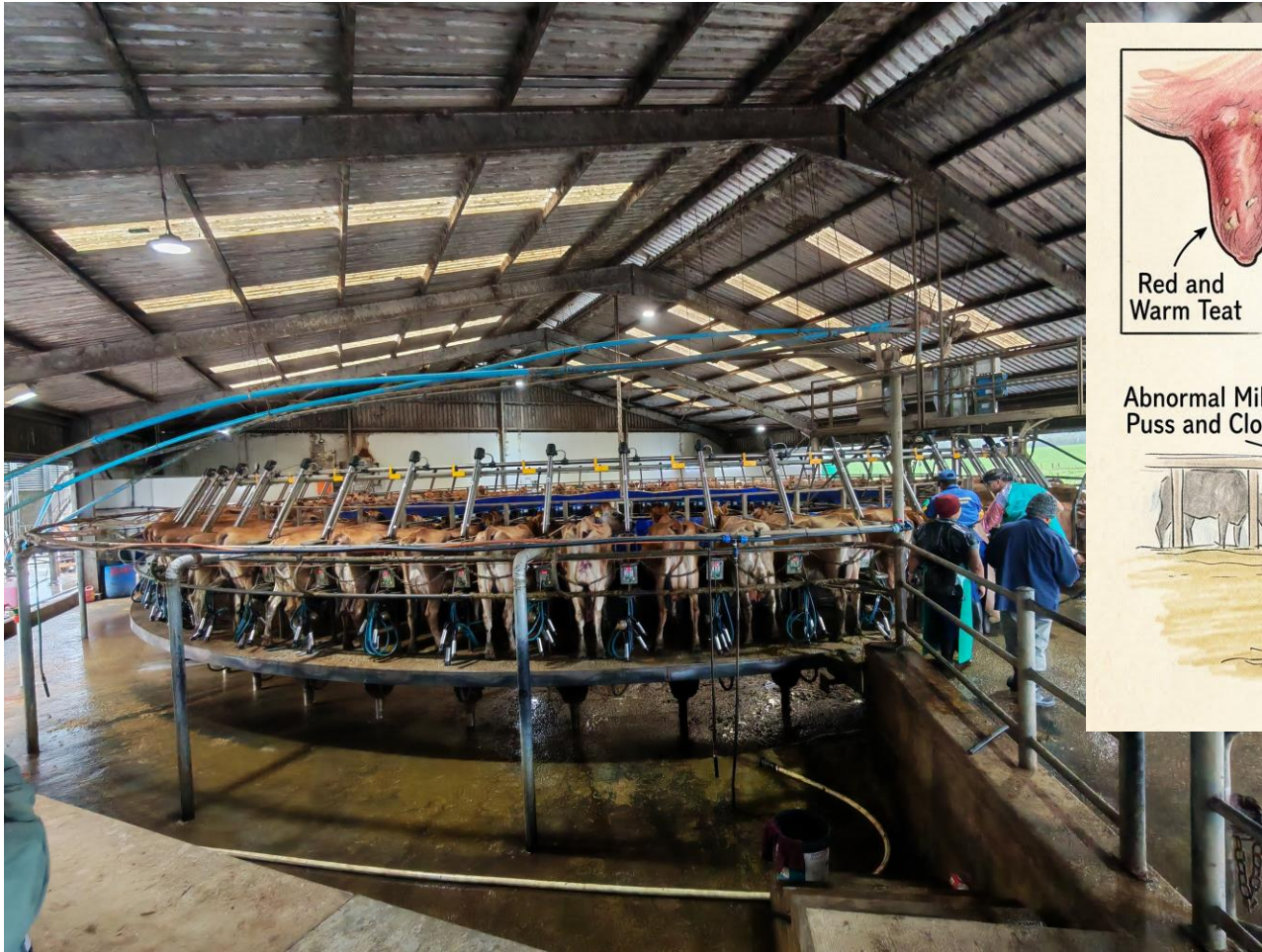
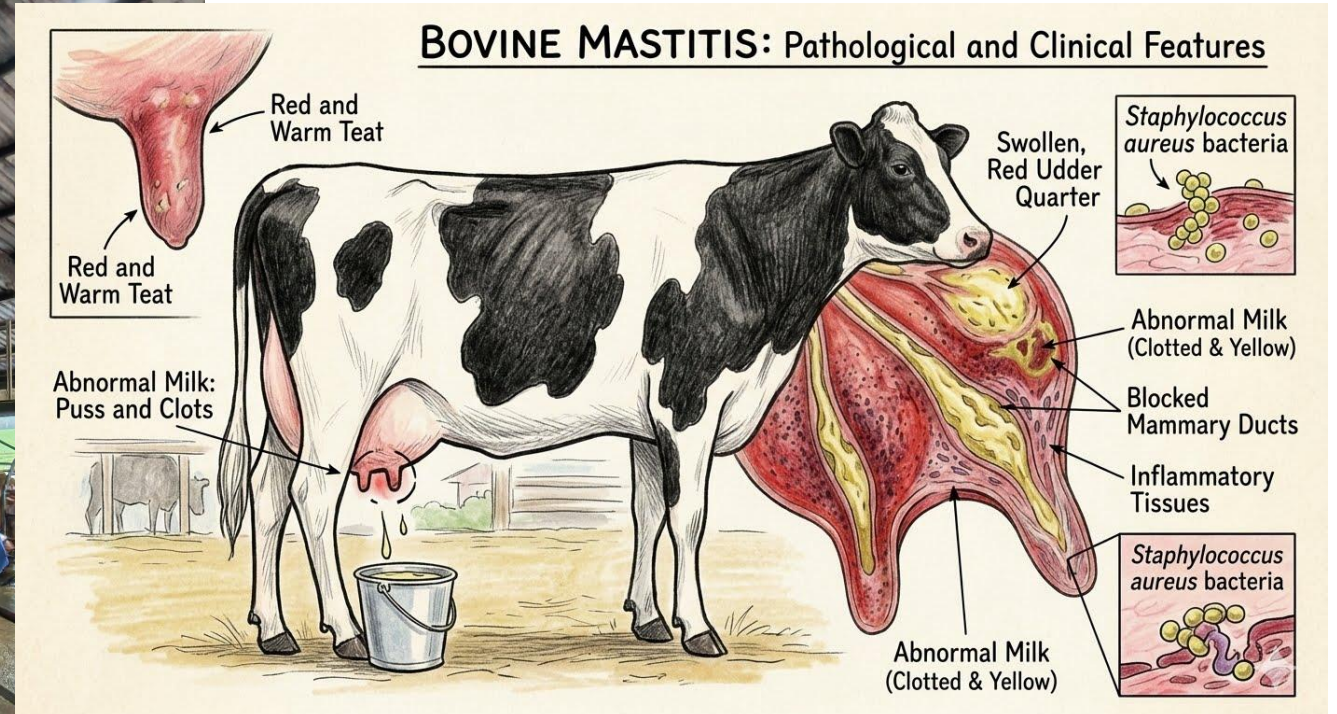
- **3. INHIBITION OF QUORUM SENSING**
(BLOCKING BACTERIAL COMMUNICATION)



- **4. ANTI-ADHESION EFFECTS**
(PREVENTING HOST ATTACHMENT)



Udder Health / Control of Mastitis



Mastitis Prevention and Treatment

- Some plants have good activity against *S. aureus* (mastitis pathogen)
- Direct antibacterial efficacy – clinical isolates
- Anti-biofilm – good results
- Lack of toxicity to bovine cells
- Anti-inflammatory and antioxidant effects



Preferred Remedy for the Treatment of Senkobo Disease in Nigeria

9.2 Streptothricosis (dermatophilosis)

Ngunya (Fulfulde), Upele kwa ngosi (Swahili)

This is a skin disease of cattle, especially prevalent in young animals. It is of economic importance because of the damage to the hide, loss of condition in chronically affected animals and occasional death.

Signs

- skin lesions, mostly on the back, shoulder and hindquarters, around the ears, groin and between the legs. Papules, which leak serum, appear and form crusts
- a raw bleeding surface, beneath the crusts
- a seriously affected animal is emaciated and weak
- the end of humid and hot weather conditions often results in spontaneous recovery. However the disease may return again the following wet season. The severity of the disease depends on age, sex and breed of the animal.

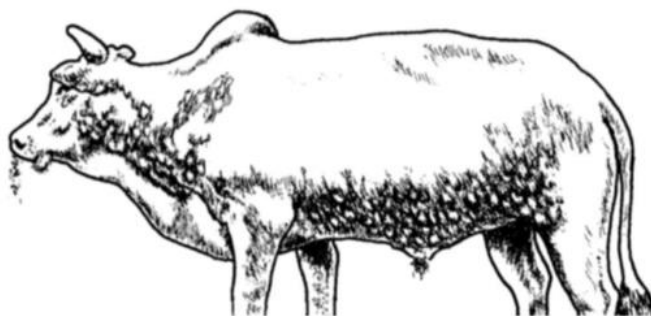


Figure 12: Skin lesions caused by Streptothricosis

Plants



Cause

Ethnovet: germs which are considered to be evil spirits

Conventional: bacteria. Factors such as prolonged wetting by rain, high humidity, high temperatures and various ectoparasites like ticks reduce the natural barriers of the skin and are risk factors in developing streptothricosis.

Treatment 1

Materials:

- *Khaya anthoteca* {B} 1 kg
- *Psorospermum febrifugum* {B} 1 kg
- *Ricinus communis* {SD} 0.5 kg
- Limestone handful
- Butter 2 kg

Pound 1 kg each of the bark of *Khaya anthoteca* and *Psorospermum febrifugum* and add one handful of limestone powder. Roast 0.5 kg of *Ricinus communis* seeds and grind them to powder. Mix the powders and add butter to make a paste.

Remove any hard crusts from the skin of the affected animal. Apply the paste on the affected area daily for 3-7 days, depending on the severity of the infection. New crusts may appear but will fall off. New hair will grow on treated areas in about 2 weeks.

Treatment 2

Material:

- *Solanum aculeastrum* {F} 5 or more fruits, depending on the surface area affected.

Roast the fruits of *Solanum aculeastrum* and slice them into halves.

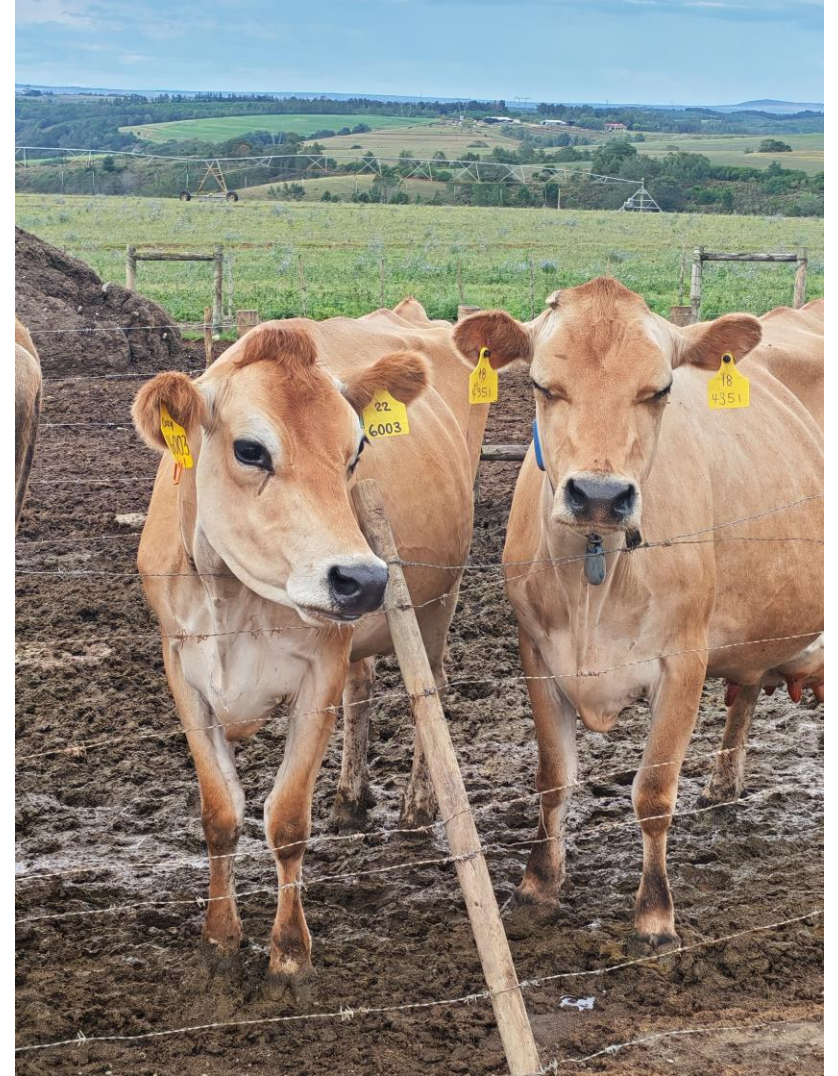
Tether the infected animal and remove the crusts before treatment. Thoroughly scrub the affected area for 1-3 days with the fruits. The crusts will fall off and new hair will start growing on the affected area.

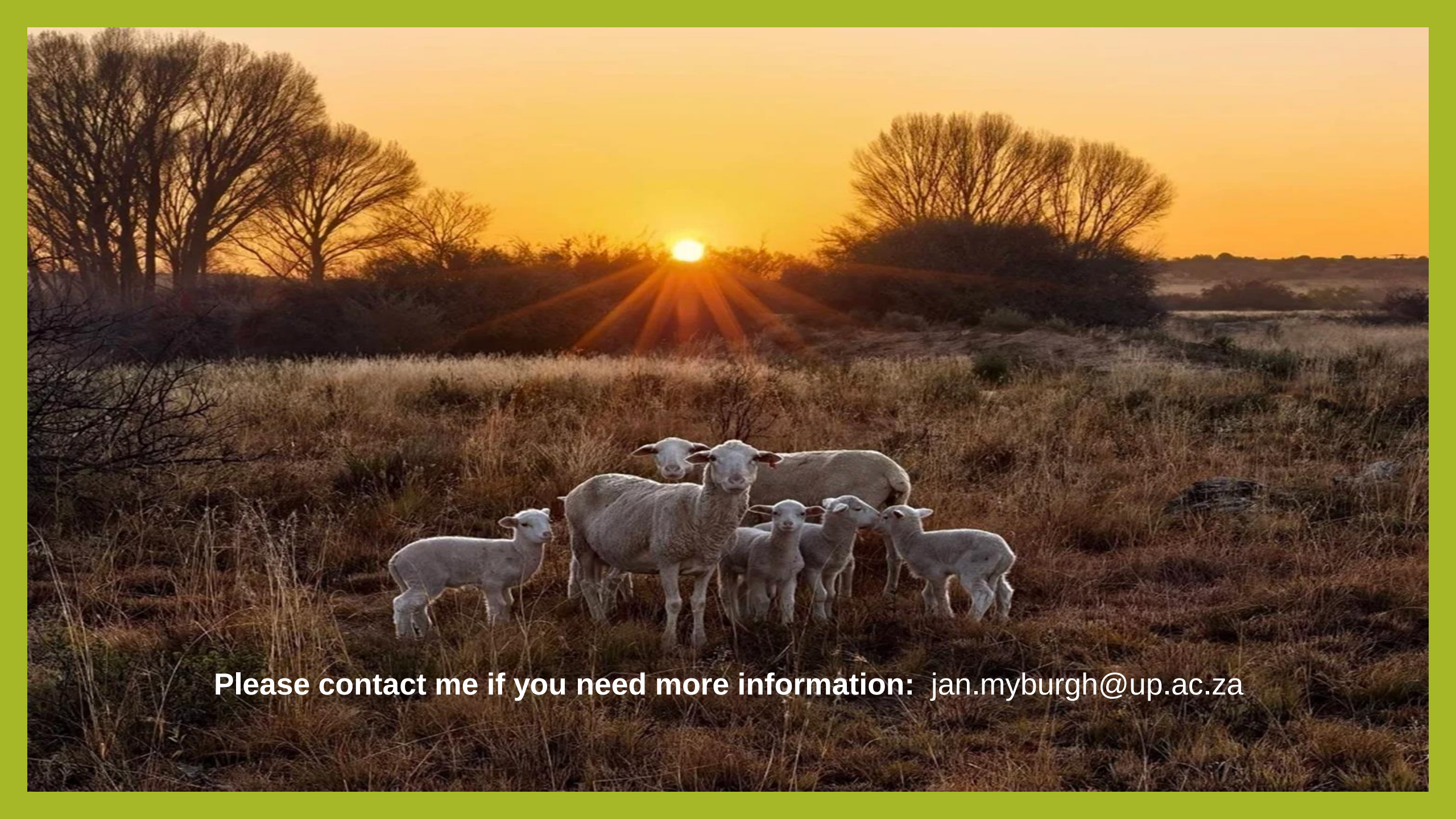
What *can* we have in our Toolboxes...

- **Conventional (allopathic) drugs +**
 - Plant Remedies (phytomedicine)
 - Homeopathic Remedies
 - Traditional Chinese Veterinary Medicine
 - Herbal Medicine
 - Acupuncture
 - Nutraceuticals
 - Physiotherapy
 - Essential oils

Holistic approach: what is the cause?
Treat the **cause** not the *clinical signs*!

“Don’t find fault. Find a remedy.” Henry Ford



A photograph of a group of sheep and lambs in a field at sunset. The sun is low on the horizon, creating a warm orange glow and long shadows. There are trees in the background and tall grass in the foreground. The text "Please contact me if you need more information: jan.myburgh@up.ac.za" is overlaid at the bottom.

Please contact me if you need more information: jan.myburgh@up.ac.za

Bridging the gap: using alternative and natural remedies alongside standard veterinary medicines to keep livestock healthy

Jan Myburgh

Tsalta Green Veterinary Solutions, Pretoria

Introduction

The concept of *Integrative Veterinary Medicine* is well established in companion animal hospitals all over the world. The American Veterinary Medical Association recently recognised this therapeutic approach.

Integrative Veterinary Medicine promotes animal health (treatment) using the most efficient and rewarding remedies (therapy), i.e. it combines complementary (or alternative) therapies together with the more conventional allopathic care of animals. It is not an *either-or* approach, but completely *integrative*. Although the Integrative Veterinary Medicine approach is more commonly used by companion animal veterinarians, there is an unlimited potential for the use in production animals. The sooner production animal veterinarians and farmers embrace this approach, the better....

This presentation highlights the benefits of Integrative Veterinary Medicine for production animal veterinarians and farmers, focusing on how combining diverse therapeutic options improves daily livestock disease management. During the presentation the practical use of *plant-based remedies* (phytomedicine) in production animals in southern Africa will be discussed.

Current Clinical Challenges and Problems

What are the challenges and problems that we face? Livestock veterinarians and farmers are operating under intense pressure to balance animal welfare and animal productivity with strict antimicrobial stewardship requirements. More stringent regulations - such as bans on prophylactic antibiotic use - will most likely come into effect in future.

The core clinical challenges of antibiotic use revolve around managing antimicrobial resistance (AMR) despite limited diagnostic and economic resources. Veterinarians are under pressure to stop prophylactic (preventive) and metaphylactic (group

treatment) antibiotic use, yet they lack rapid, affordable, and in-field diagnostic tools (antibiograms) to quickly identify the specific bacteria causing disease.

The rise of *multidrug-resistant* (MDR) bacteria directly compromises the effectiveness of available antibiotics. Veterinarians and farmers face a dilemma when bacteria become resistant to first-line drugs, increasing the pressure to use *Highest Priority Critically Important Antibiotics* (HPCIAAs) - such as fluoroquinolones or 3rd/4th generation cephalosporins - which are reserved for human health. Bacteria are increasingly forming *biofilms* (communities of bacteria protected by a slime layer), making them highly resistant to both antibiotics and the immune system.

Integrative Veterinary Medicine - a Potential Solution

Integrative Veterinary Medicine combines conventional veterinary care with clinical approaches like: acupuncture; special nutrition and nutraceuticals; therapeutics (Vetbrands); homeopathy; herbal and plant remedies, to treat specific problems. It provides additional “tools” for veterinarians and farmers to effectively use in support of their conventional therapeutic strategies.

Integrative Veterinary Medicine not only addresses specific therapeutic challenges, but also the regulatory/market pressures in modern production animal agriculture. A major future global challenge in livestock production is *antimicrobial resistance*. Regulatory initiatives in the EU require a 50% reduction in antibiotic use by 2030, and favour the use of homeopathic and plant-based remedies (phytomedicine) on farms. Integrative Veterinary Medicine provides strategies that contribute to the prevention of infections, and a reduction in the use of conventional antibiotics, thus helping to manage antibiotic resistance and improve food safety.

A specific area with the most potential for *quantum-leap* development in southern Africa is the use of *indigenous plant products* (phytomedicine) for the manufacturing of specific production animal remedies. Plant products have been used by African pastoralists for centuries and it still remains a primary livestock healthcare solution in large parts of rural Africa today. Known as *Ethnoveterinary Medicine*, this practice has a documented history of effectiveness that predates the arrival of Western Veterinary Medicine.

Veterinary herbal medicine utilizes the active botanical compounds of plants to treat illnesses, improve digestion, and combat infections in cattle. Producers administer these plant remedies orally through feed, topically as salves, or via boluses to manage common livestock ailments. For example, garlic and neem act as powerful natural insect repellents and antiparasitic, while ginger and peppermint stimulate rumen motility to treat bloat. Additionally, anti-inflammatory plants like *Aloe vera* soothe skin lesions and udder inflammation caused by mastitis. This holistic approach supports the animal's natural healing processes and offers an effective, residue-free alternative for organic herds where synthetic chemical medications are restricted.

Veterinary acupuncture serves as a non-pharmaceutical medical treatment to manage pain, boost immunity, and regulate reproductive or metabolic issues in both beef and dairy cattle. By inserting sterile needles into anatomically precise points along the nervous system, practitioners stimulate the release of pain-blocking endorphins and increase local blood circulation. Livestock producers use this therapy to address musculoskeletal lameness, assist downer cows, alleviate mastitis, and resolve reproductive complications like uterine prolapse or low fertility. Ultimately, implementing cattle acupuncture helps herds recover from acute or chronic nerve injuries while minimizing reliance on chemical medications, preventing drug residues from contaminating the food supply

Conclusions

Companion Animal Medicine is leading this new approach! However, it is critically important for production animal veterinarians and farmers not to lag behind.

Daily disciplined choices must be made by the veterinarian and farmer to improve the well-being and health of every individual production animal. At the end of the day, the attending veterinarian (or farmer) must decide what he or she considers the best therapeutic approach for each clinical case and outbreak. Allopathic drugs will still be available for the control of serious infections and life-threatening diseases. The use of all the other therapeutic options available will only make the rural veterinarian and farmer stronger and not weaker.

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How not to save yourself broke on a beef farm

DENNIS TSONDAYI

Most farms don't go broke from low prices. They go broke from saving themselves broke.

Feeding without targets (poor feeding strategy, buying on price alone, water shortage or unavailability, stressed cattle, poor mixing, inadequate feeding space– each one of these may look small until you add it up over 1,000 heads.

Profit is

Not in the price. It's in the process you control every day

If you don't measure it, you can't manage it. If you don't manage it, it manages you.

The 5 levers that keep you profitable

01



Feeding strategy

Don't just feed. Feed to a target. Every kg must have a job – maintenance, growth, or profit.

02



Raw materials

Buy right, at right price.
Cheap is not always cheap.
Buy on nutrient, not ton.

03



Water quality and availability

Would you drink it? 40–100L/day. 1% drop in water = 3–5% drop in feed intake.

04



Cattle comfort

Comfort is not luxury, it's ROI.
More lying time = better rumen = higher ADG.

05



Mixing & processes

Optimize, don't just cut. Fix feeders & troughs to stop the silent 5–15% wastage.

✓ **Diagnostic lens:** Each lever is measurable weekly. Fix the biggest leak first, then stack gains.

1. Strategic Feeding: don't feed for the sake of feeding and don't starve for the sake of saving

CORE PRINCIPLE

Feeding without a target is like driving without a destination

You burn fuel and get nowhere. Every kg of feed must have a job – maintenance, growth, or profit. If it doesn't move ADG or FCR, it's cost, not feed.

What am I saving if I save on supplementing my cows and I drop my PD from 80% to 40%?

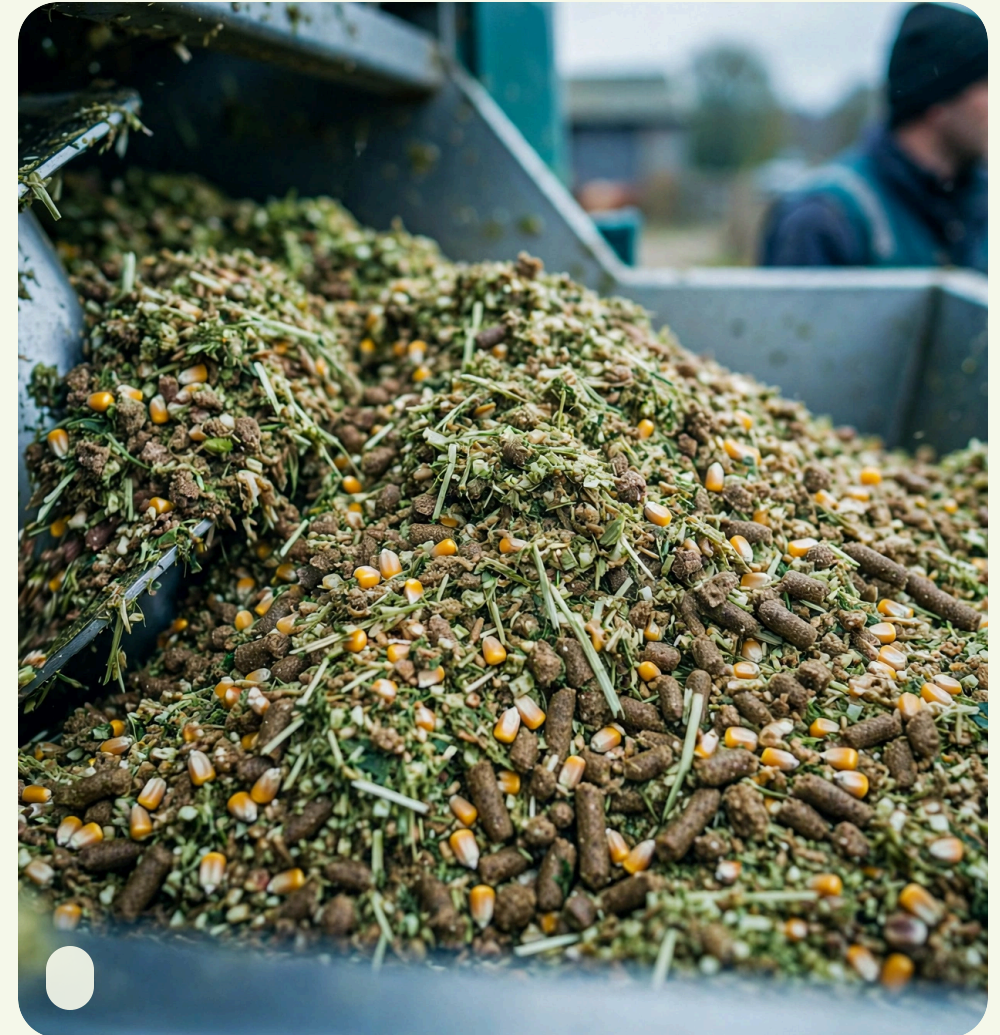
What am I saving if I do not supplement my cows and I only get to cull them at 4 years? Who pays the cost for the extra year before culling?

COMMON MISTAKES

- ✗ Same ration for all groups
- ✗ Not weighing the pros and cons of supplementary feeding because of shortsightedness in decision making
- ✗ Trying to save today and forgetting the implications for tomorrow

FIX NOW

- ✓ Group feed by Age weight & frame in order to provide the right supplement
- ✓ Understand nutritional requirements for the different animals at the different stages and feed to fulfill these
- ✓ There is no such thing as feeding for half a calf



Buy the right raw materials at the right price

Cheap raw materials are always expensive

- **Low price = hidden cost** – low CP, high moisture, mycotoxins, variable digestibility
- **\$10/t cheaper feed** that drops ADG 0.1kg/d costs you \$35+ per head over 100 days
- **Principle:** Buy on \$ per % protein & \$ per MJ energy, not \$ per ton
- Consistency > bargain. Reject variable loads, factor 15–30% storage loss

**UNDERSTAND THE VALUE OF YOUR RAW MATERIALS TO
UNDERSTAND THE COST OF YOUR FEED**

Smart buying checklist

1

Lab analysis always

Never buy without CP, energy, NDF, moisture, mycotoxins. No data = no deal.

2

Cost per nutrient, not per ton

Calculate R per % protein, R per MJ. Compare apples to apples.

3

Seasonality & forward contracts

Lock maize/silage at harvest, protein in off-season dips.

4

Supplier vetting > bargain hunting

Consistency beats one-off cheap load. Reject variable batches.

5

Factor storage loss

That cheap stover rotting outside is not cheap – add 15–30% wastage.



WHAT CHEAP HIDES

High moisture, mold, dust, variable protein. You pay at the bunk, not the scale.

Water availability and quality: Is it there and would you drink it?

Cattle drink 30–100L per day. If you wouldn't drink what you supply, why should they?

30–100 L

Water intake / head / day. Biggest nutrient after oxygen

1% ↓ water = 3–5% ↓ feed

Lower intake = lower ADG, more disease, more meds

- 🔥 **Dirty water = invisible loss:** algae, manure, feed scum cut intake and add disease pressure. What are we saving by not ensuring cleanliness of water?
- 📍 **Availability-** What are we saving by not pumping water from 4km away and asking the cows to travel 8km per day? How much energy are the cows using to go get some water. In grazing systems, what are we saving by having one drinking point instead of multiple troughs throughout the farm.
- 🔧 **Rumen function affected by dm% of feed** – 50–55% DM for ingested feed gives optimal rumen operating conditions. No water means less feed intake

❓ We can save on not putting adequate drinking points but what are we losing on?



Comfortable cattle **gain faster**

Stressed cattle don't eat, don't convert

Fight, get sick, shrink. Stress is paid at the scale and in meds. Comfortable cattle spend more time lying down and have better rumen function thus better feed conversion. How much are we saving in feedlots by not having some shade present?

Heat stress not only affects the current cattle, but it also affects the offspring as well

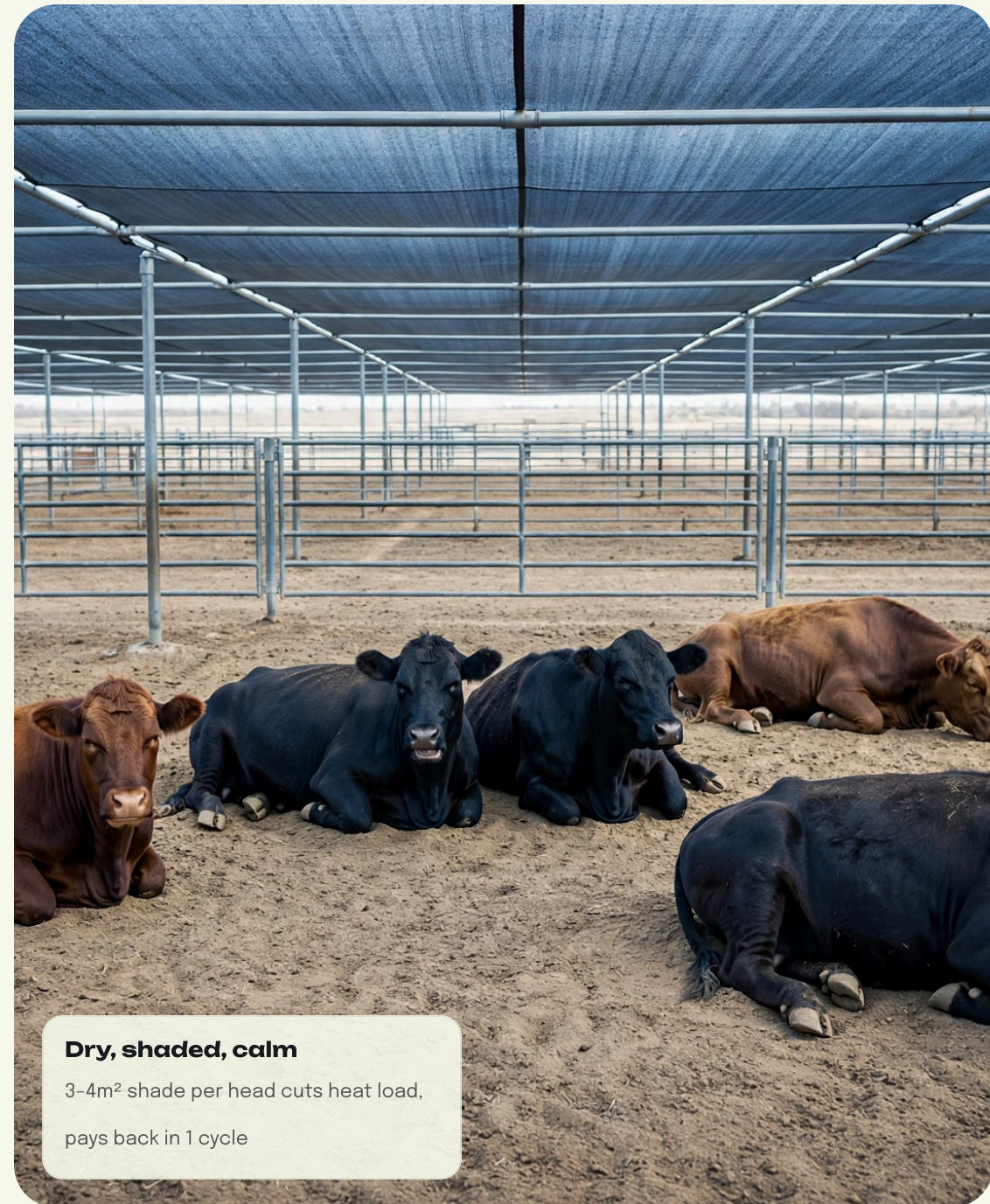
The more shade there is in your paddocks the more comfortable the cattle are—allocating trees within grazing paddocks to allow some time in the shade for the animals. Heat stress cuts ADG by 20–30% and raises FRC by 15%.

Kraaling cattle vs Fencing paddocks or hot strip grazing

6–18hrs of kraaling vs all day grazing. What exactly are we saving? We can save on the fencing costs but what are we compromising on?

Question to take home

How comfortable are your animals? What does 10% more comfort return?



Dry, shaded, calm

3–4m² shade per head cuts heat load,
pays back in 1 cycle

Optimize, don't just **cut costs**

PRINCIPLE

Cutting blindly cuts performance

Optimizing improves both cost AND gain. Process discipline beats cheapest labour or cheapest machine.

- + Every batch must be the same – same order, same time, same check
- + Train feeders on process, not shortcuts



TMR UNIFORMITY = PROFIT

TARGETS THAT PAY

- 🔥 **Mix 3–5 min** – over-mix destroys fibre, under-mix causes sorting
- 📦 **Penn State box:** 40–50% on middle sieve, <10% fines at bottom
- 👁️ Check uniformity daily – grab 5 spots along bunk

Over-mix

Breaks effective fibre
→ acidosis

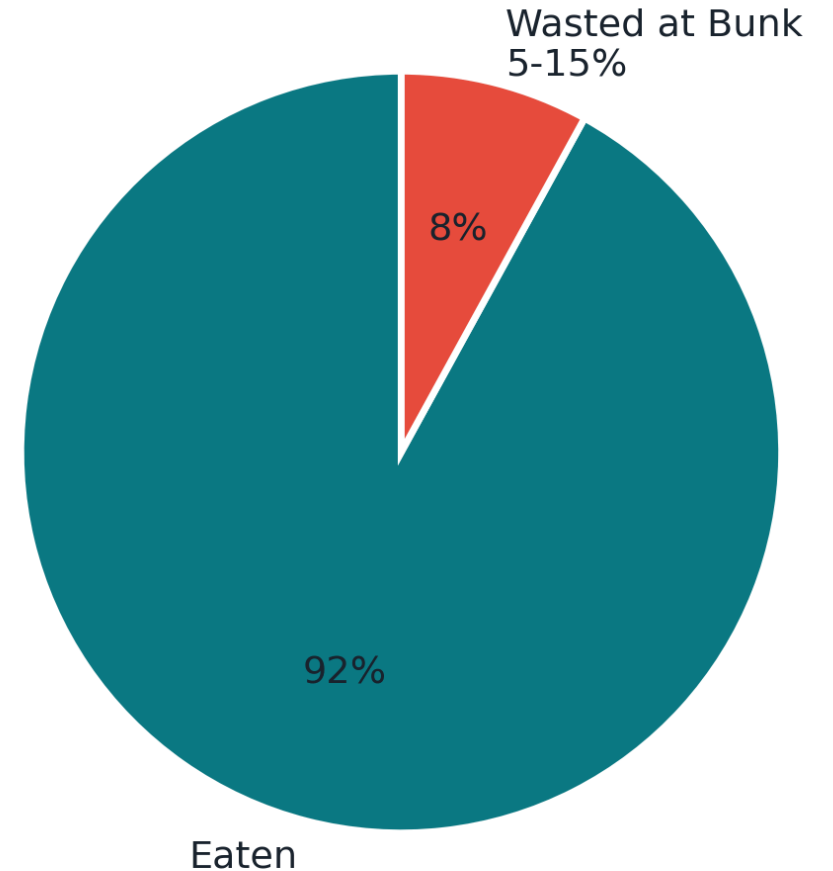
Under-mix

Sorting → sick pen,
variable ADG

Feeders & troughs: the silent thief

- 🔍 **Audit feeders:** What are you saving by not repairing feeders with holes? What are you saving by overfilling feeders once a day to avoid feeding twice?
- 🏗️ **Trough design:** What are we saving by having poorly constructed feeders in which spillages are evident
- 🕒 **You can save once by not buying feeders, but you will pay for it every day through feed wastages and spillages!!!**

Where Your Feed Goes: The Silent Thief



Where your feed actually goes – audit last week

⚠️ 8% average wastage



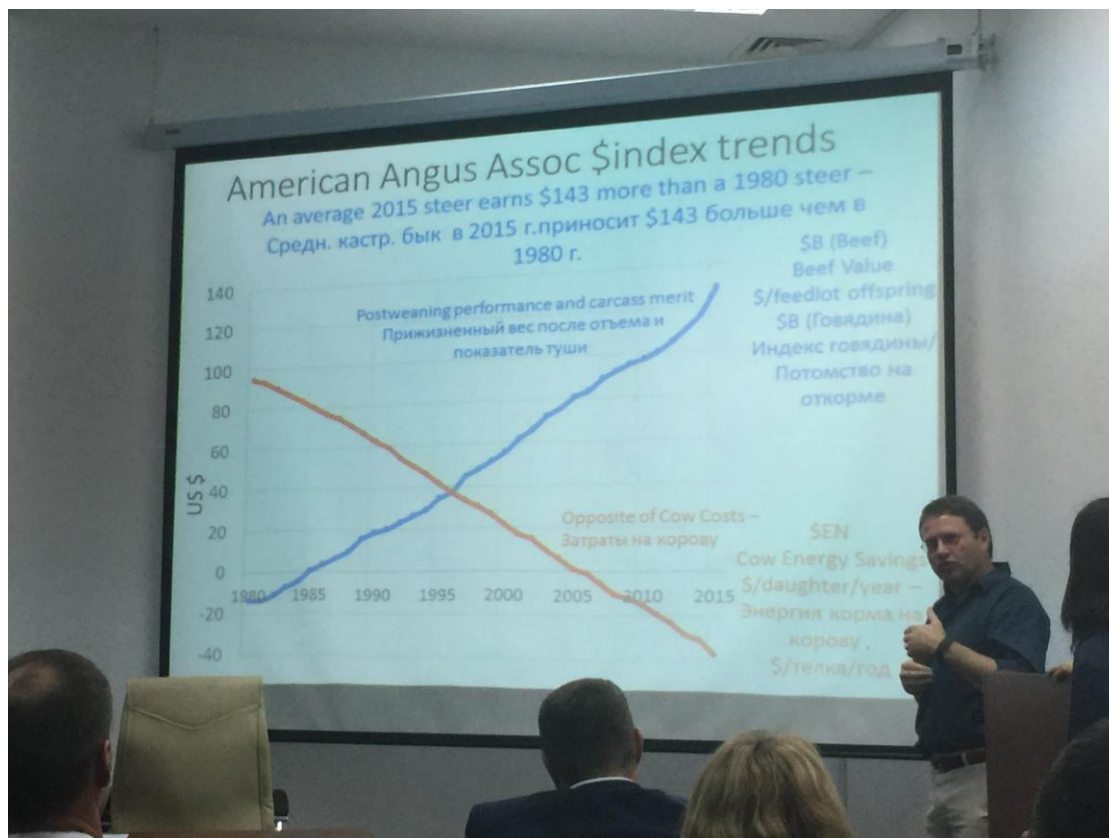
Zimbabwe Herd Book (ZHB) Beef School

- Modern Stud Breeding Trends

PJ BUDLER

OIL & GAS – Cow/Calf Producers - Feedlots – Packers - Retailers





EPD's & Genomics



Recreation





Growth (Weight)



Muscle



Milk



Marbling

Linebreeding

Highly strategized
inbreeding

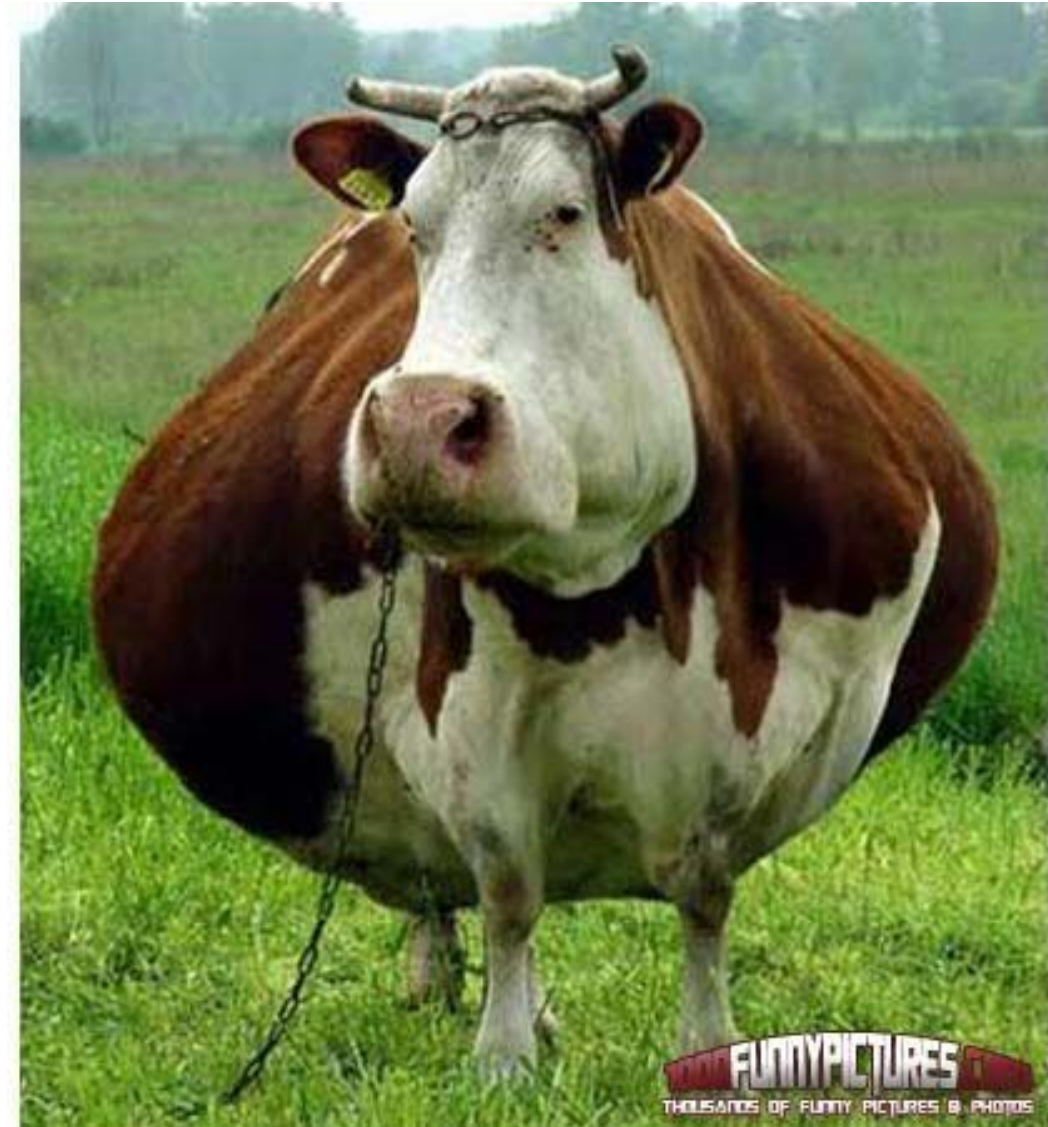


FAT (Inherent Body Condition)

Good, bad or ugly?

Positive Correlations:

Maturity Pattern, Fertility,
Temperament,
Foraging Ability, Carcass Quality

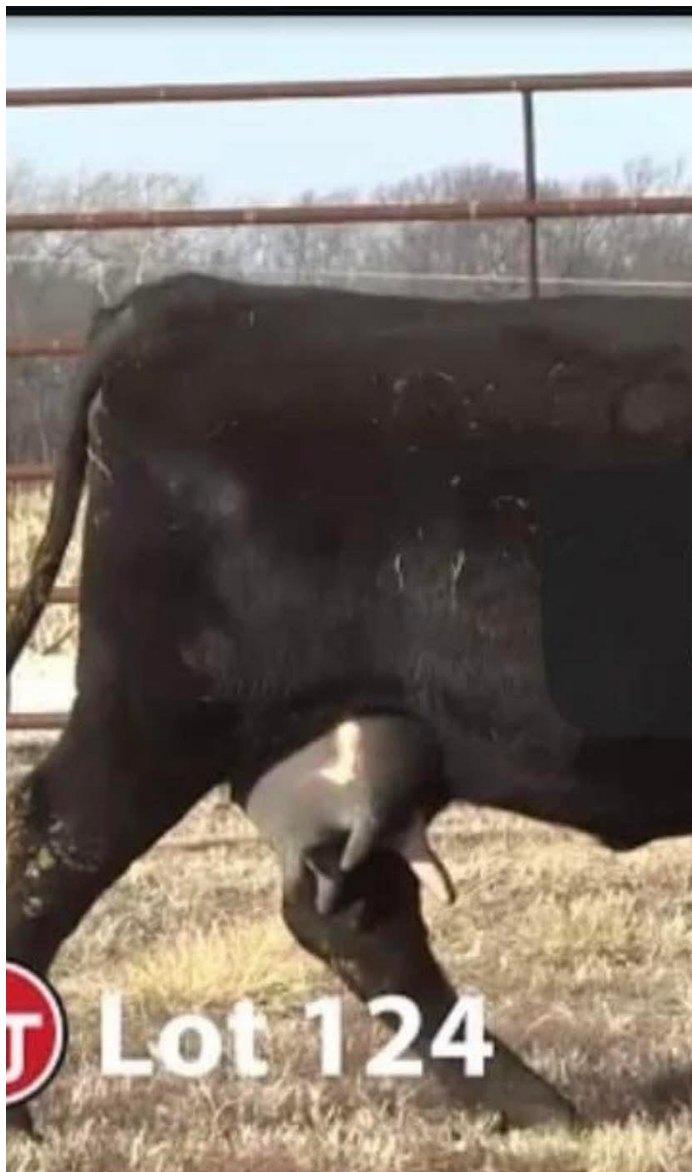


Breeding is an Art and a Science

OR

Breeding is an ART and a \$cience





Leachman ABCs/Indexes

\$PROFIT	\$38,541	Percentile Rank - Top 0.01%
\$Ranch	224	0.07%
\$Feeder	228	0.2%
Feed-Gain	-0.4	<1%
Intake	-15	14%
C. Ease	★★★★★	
Growth	★★★★★	
Maternal	★★★★★	
Udder	★★★★★	
Fertility	★★★★★	
Disposition	★★★★★	
BW	-2.4	3%
WW	49	23%
YW	101	6%
MILK	34	Avg: 22
SC	0.07	90%
HT	0.38	Avg: 0.62
MAT WT	17	Avg: 28
REA	0.85	45%
IMF	0.82	2%
CAR WT	60	<1%
BF	-0.03	30%
PAP	-0.06	

Born: 2/3/22
Breed: 64B 36C
Homozygous Polled
Homozygous Black
Cane Code: 704XB171

Hook's Capitalist 37C
Sire: Leachman Heritage S122H
GRU Stabilizer DX140
Leachman TL BottomLine G385E
Dam: GRU Stabilizer HS073
GRU Stabilizer FS976

Leachman **Kadoka** S717K



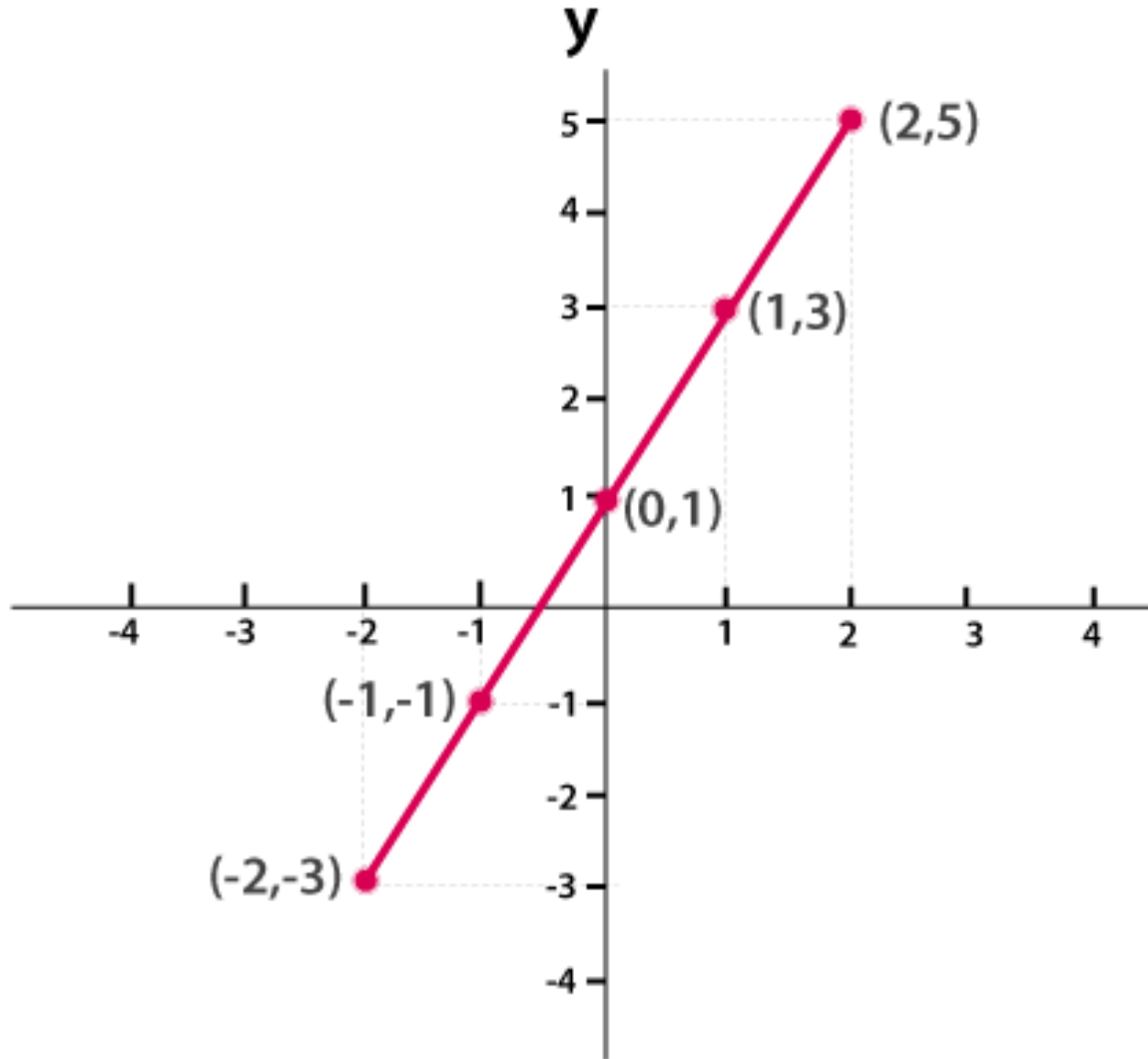
- Introducing a new level of \$Profit and a level of \$Ranch that many thought would never be attainable.
- A true genomic giant, this Capitalist grandson presents an ABC profile that leaves nothing left to be desired! From calving ease to maternal excellence and fertility, feed efficiency to carcass merit- Kadoka moves the needle for every measurable trait you can imagine!
- He is the second highest bull in our line-up for both \$Profit and \$Ranch!

☆☆☆☆☆
Five-Star
ALL-AROUND

\$30/unit

Owners: Leachman Cattle, Grubl Ranch, Marc & Debbie Rieger





Phenotype vs Genotype?
The most important selection tool

Phenotype
Estimated Breeding Values/Estimated Progeny Differences
In-herd Indexes
Pedigree
Raw Data
Genomics





- Contact Information

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Harnessing Africa's Cattle Potential

September 2026
Douglas Bruce

The Big Question?

Are YOU harnessing Africa's cattle potential ?

- What is your GENETIC PLAN for your herd?
- What is your cost per cow per annum?
- Are you profitable?

Lets look at some aspects together

The Changing World

- Beef industries are changing worldwide.
- Profitability in beef farming has been dwindling.
- Dairy cows produce more beef than beef cows in some countries
- Land prices are increasing.
- Very few large ranches are left in Zimbabwe & the World.
- Bush encroachment is widespread in Zimbabwe & Worldwide.
- Beef production is turning into a hobby[for fun, love and tradition]-ALL are supported by another financial means.
- Most farmers farm remotely.
- Cows are TOO BIG

The supply chain

- Breeders-feedlots-abattoirs-wholesale-retail-this is changing as well
- Feedlots are getting a bad reputation-CAFO-Concentrated Animal Feeding Operations[includes piggeries, poultry, dairy]-welfare & wastes
- Grassfed beef is making an appearance
- Breeders are going broke

Our Sanga History

- African cattle were closely linked to their peoples-these breeds were linked to Bantu Migrations southward.
- Migrated south along central, east and west coast corridors.
- Managed under a herding grazing & browsing systems & night kraaling.
- They ADAPTED to their environment-the veld, predators, parasites[ticks and flies] and diseases and were drought tolerant.
- Breeding & calving naturally-small resilient calves that are tough & survive.
- Breed diversity-smooth slick coats, speckles, patches, colours, humps, sloping rump angles, narrow width and horned[but some were polled]

Bantu Migrations

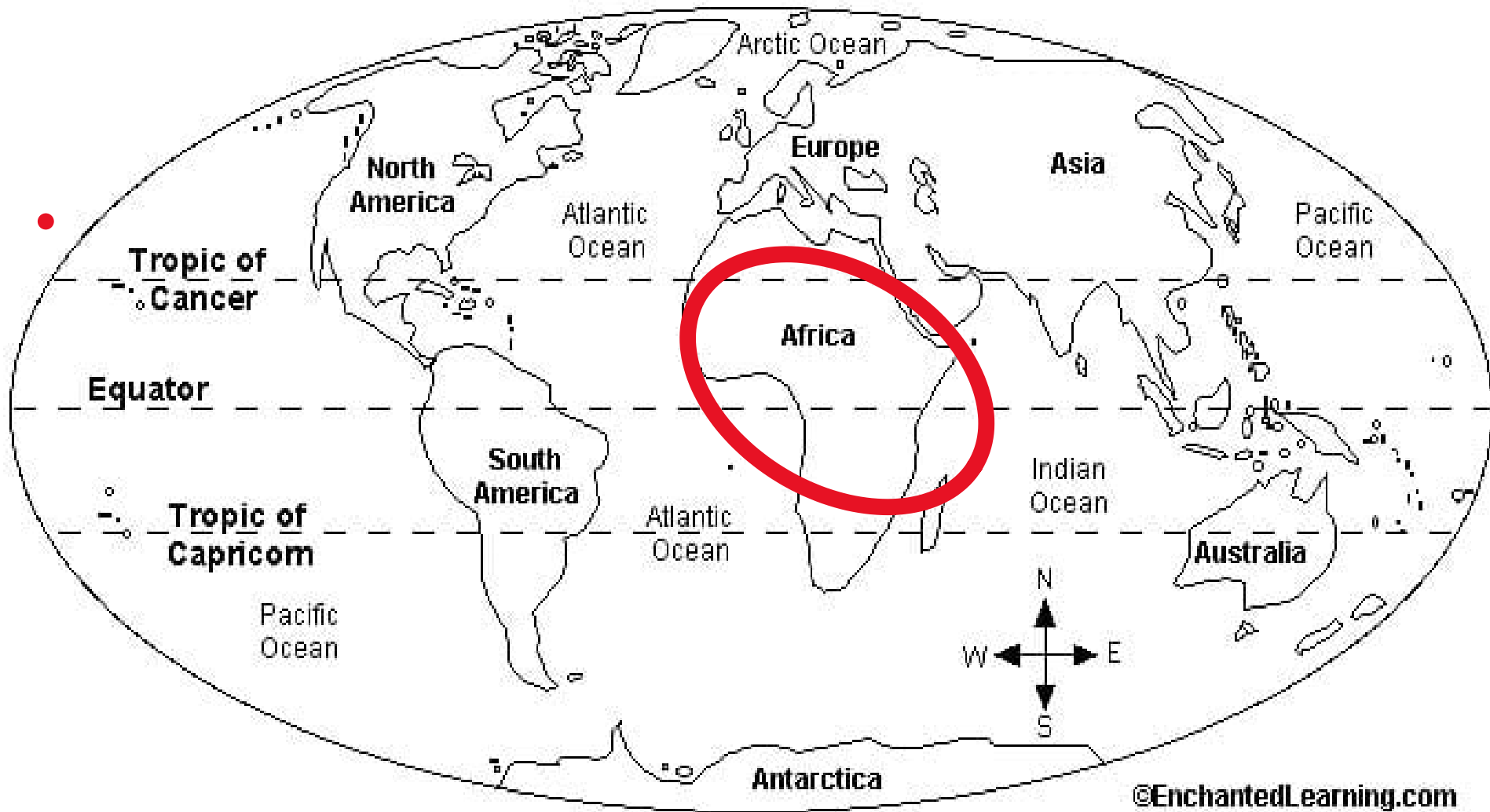


Bargrove
Veterinary Group



Livestock Production
CONSULTANTS

The World



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Sanga Research

- Government Research Farms-did good work.
- Quantified the breeds and established breeding performance.
- Performed cross breeding comparative trials.
- Matopos Research trials spanned many years
- Summary-pure Sanga breeds out-performed exotics or their Sanga crosses

Initiated in 1974

- 900 purebred and crossbred cows
 - Afrikaner Mashona Nguni Tuli
 - Brahman Charolais Sussex
 - 23 cow genotypes
- Mated to 7 unrelated bull breeds
 - Afrikaner Tuli
 - Brahman
 - Angus Hereford Simmental
 - Holstein
- Terminated 1990

Maternal Productivity

	<u>Cow</u>	<u>Calving</u>		<u>18m</u>	
	<u>Wt</u>	<u>Rate</u>	<u>Mortality</u>	<u>Wt</u>	<u>Prod*</u>
M	351	74	6	261	346
N	382	67	9	279	335
T	400	69	5	275	318
B	438	67	11	299	311
C	478	66	11	276	284
A	397	56	8	273	281
S	478	56	9	275	281

**Weight of calf at 18 months per unit cow weight mated*

Maternal Productivity

	<u>Wt</u>	<u>CR</u>	<u>Mort</u>	<u>18m</u>	<u>Prod</u>
M	351	74	6	261	346
N	382	67	9	279	335
SM/SN	397	69	6	277	324
AM/MA	377	66	6	268	322
AN/NA	389	62	4	278	322
SB	430	67	7	291	315
CB	474	71	6	298	313
CM/CN	431	65	6	285	313

The Sanga today

- Early settlers-initially wanted their European home-breds
- A few identified that Sanga were superior cattle
- Parent Breed Societies under ZHB remain functional and have preserved these genetics but numbers are low.
- Sanga type animals remain in communal areas
- Communal herds have been polluted with exotic genes-it was recent policy to “upgrade” these apparently “inbred” Sanga cattle
- These Smaller frame score Sanga communal cattle are due to the current production system NOT inbreeding

Mashona



Nkone



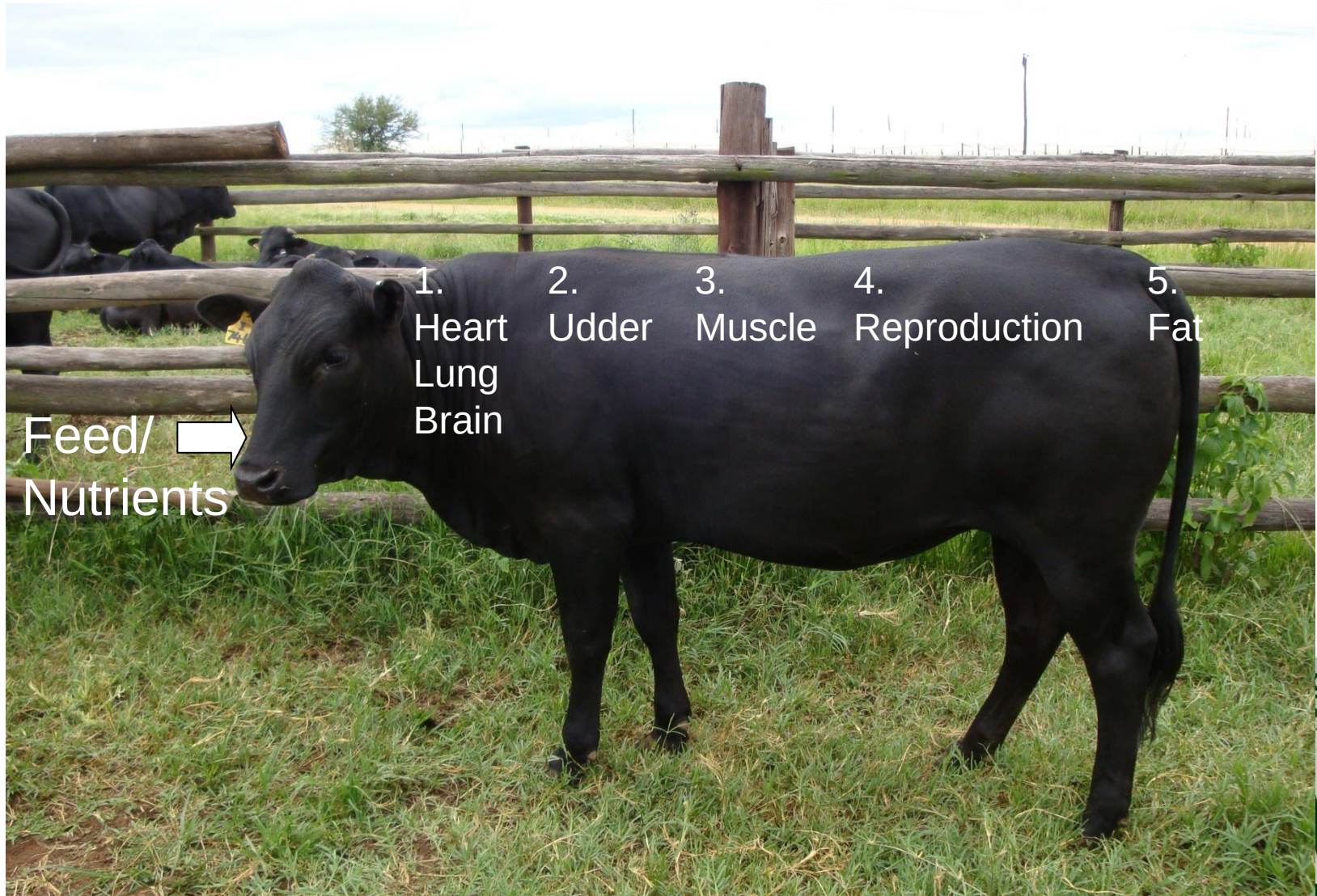
Tuli



Sanga Traits

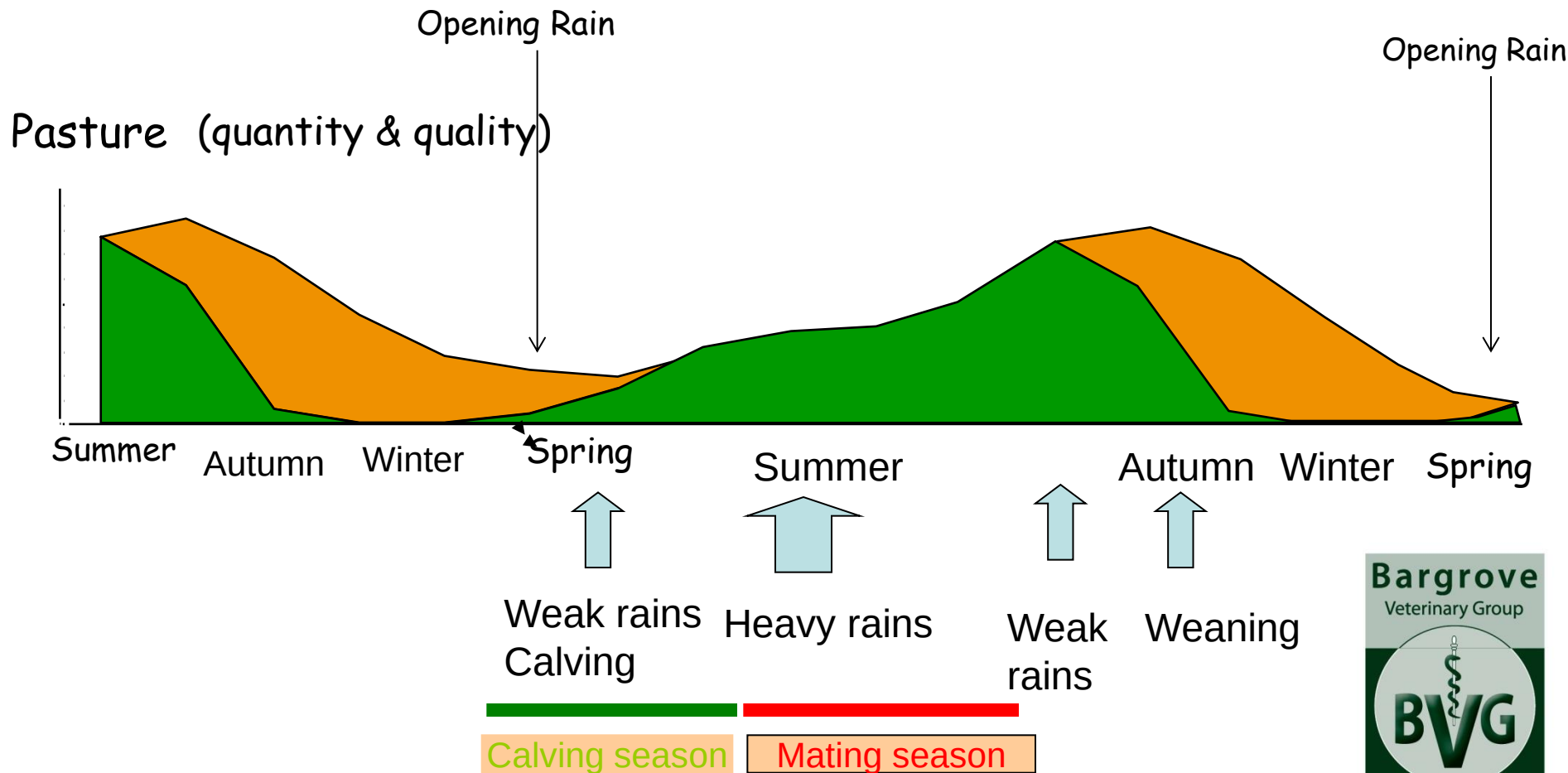
- Adaptability-adapted to Africa
- Slick gene-short coated-heat tolerance
- Herding instincts-ideal for HDG
- Grazing instincts-forbs, sedges, grasses, browse-grassfed beef.
- Mothering ability-small resilient calves, predator awareness
- Narrow bodied & poorer muscled-this is a survival trait
- Survivability-tick and parasite resistance
- Longevity-lower replacement rate
- Fertility & Calving ease-better kilo output
- Easy-care cattle-easy management

How is food assimilated



THE GREEN PERIOD

Can be very short lived in Africa



What Commercial breeding programmes are available

- Option 1-Crossbreeding[2 or 3 breed] or a composite breed.
- Option 2-Pure breeding
- What breeds, what cow lines, which terminal sires?

How do we use our rich cattle heritage to make a profit ?

60/40 Breeding Plan Proposal

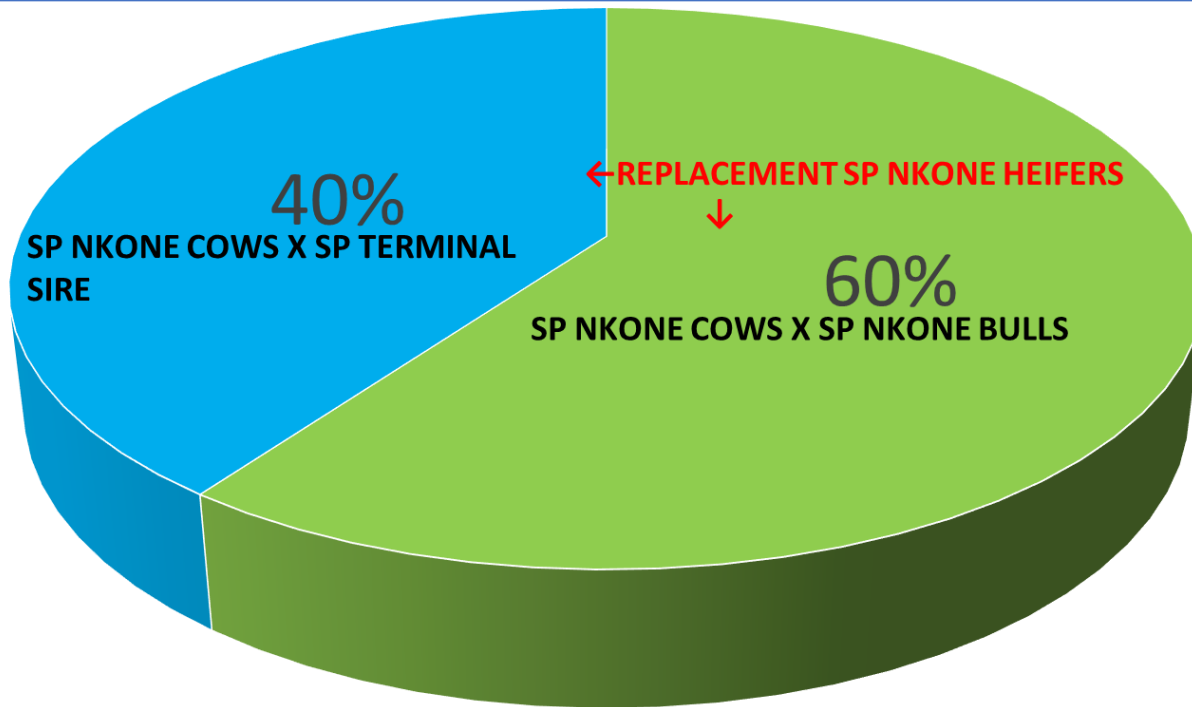
for all purebred & commercial breeders in Africa

- Keep 100 easy-care Sanga cows
- Breed 60 [Herd A] to the same breed Sanga bulls.
- Breed 40 [Herd B] to pure Exotic bulls or crossbred Exotic bulls or another Sanga breed.
- Target Herd A 90% conception = 54 calves/2 sexes = 27 heifers/year, Herd B 90% conception = 36 calves/year
- Target 20% annual heifer replacement rate to retain the 100 cow Sanga herd.
- Annually Sell 7 excess Sanga heifers, 27 Sanga males [Herd A], 36 crossbred Sanga [Herd B]

THE ANSWER TO TROPICAL PRODUCTION

Sanga 60/40

A SIMPLE BREEDING SYSTEM FOR MAXIMUM BENEFIT FROM A PUREBRED
INDIGENOUS HERD



- HERD A 60% SP NKONE COWS X SP NKONE BULLS
- HERD B 40% SP NKONE COWS X SP OTHER BREED BULLS

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Livestock Production
CONSULTANTS

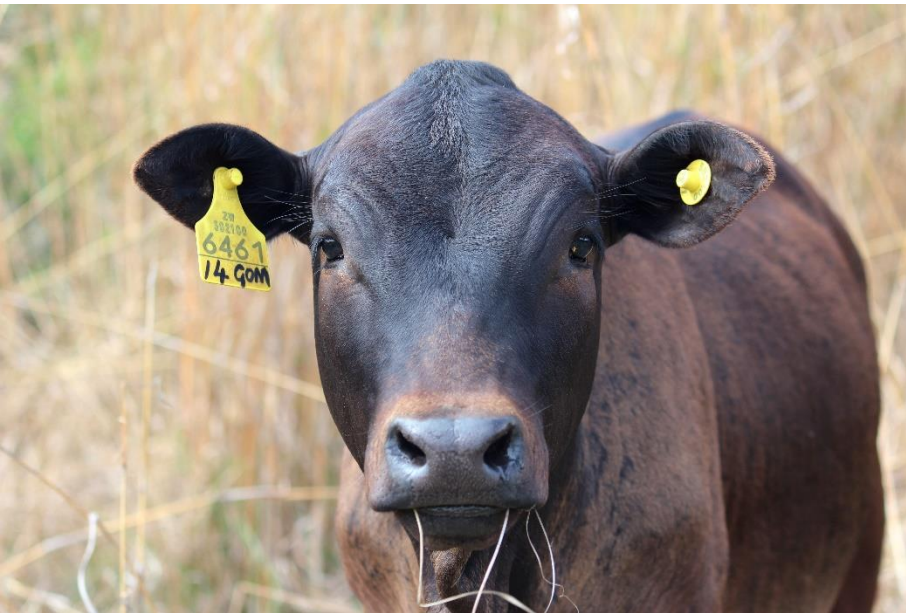
Summary

- Cows are more important than bulls-its all about cow lines [but only use good bulls]
- Sanga cows are superior
- Growth can be contributed by the sire
- We have Sanga cows cheaply and freely available
- Sanga cow herds maximize low-cost profitable production.

CHANGE WITH THE TIMES

THANK YOU

- That's my story
- Thanks to mentors Japie Jackson, George Hulme and Percy Sharp
- Any questions



Winter supplemental strategies to optimize body condition and reproduction in beef breeding animals



Dr Hinner Köster

**International Ruminant Nutrition
Consultant**



Challenges

- Cattle farmers face many challenges during a single year of production
- 50 to 70% of input costs are associated with feed
 - **therefore, strategic manipulation of nutrition can make operations more profitable**
- Knowing 1) when to supplement female animals and 2) what form of supplement will work in a given operation at a given time is crucial

BREEDING COW

- Profitability of the cow/calve operation is influenced by the % cows calving every 12 months (365 days)



Biggest reason for low reproduction rates is a limitation of the right nutrition and thereby low body condition score



Body condition as management tool

- **Body condition Score (BCS) should be an essential management tool in every cattlemen's philosophy**
- **Simple procedure**
 - **If used and managed correctly, can ensure the management of a successful beef cow-calf operation**

Body condition scores (BCS) and animal appearance at each BCS

BCS	Condition	Appearance
1	Emaciated	Shoulder, ribs and back are visible
2	Very thin	Some muscle, no fat deposits
3	Thin	Some fat deposits, ribs visible
4	Borderline	Foreribs not noticable
5	Moderate	12 th and 13 th ribs not visible
6	Good	Ribs covered, sponginess to tailhead
7	Very good	Abundant fat on tailhead
8	Fat	Fat cover thick and spongy
9	Obese	Extremely fat throughout

Relationship between body condition during the breeding season and conception

(J. MEAKER, 1991)

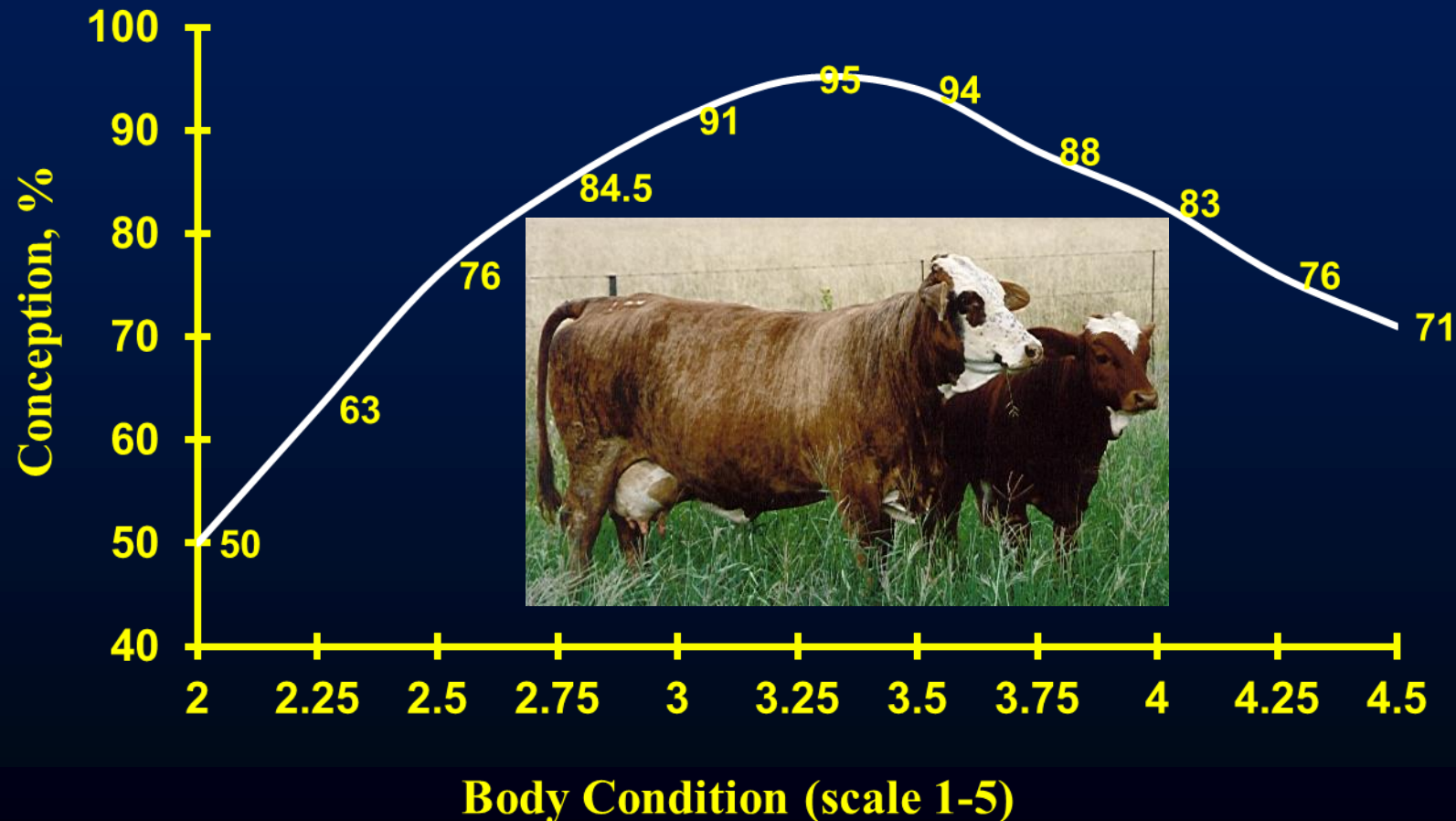


Figure 2. Effect of Body Condition Score at Calving on Subsequent Pregnancy Rate in First Calf Heifers

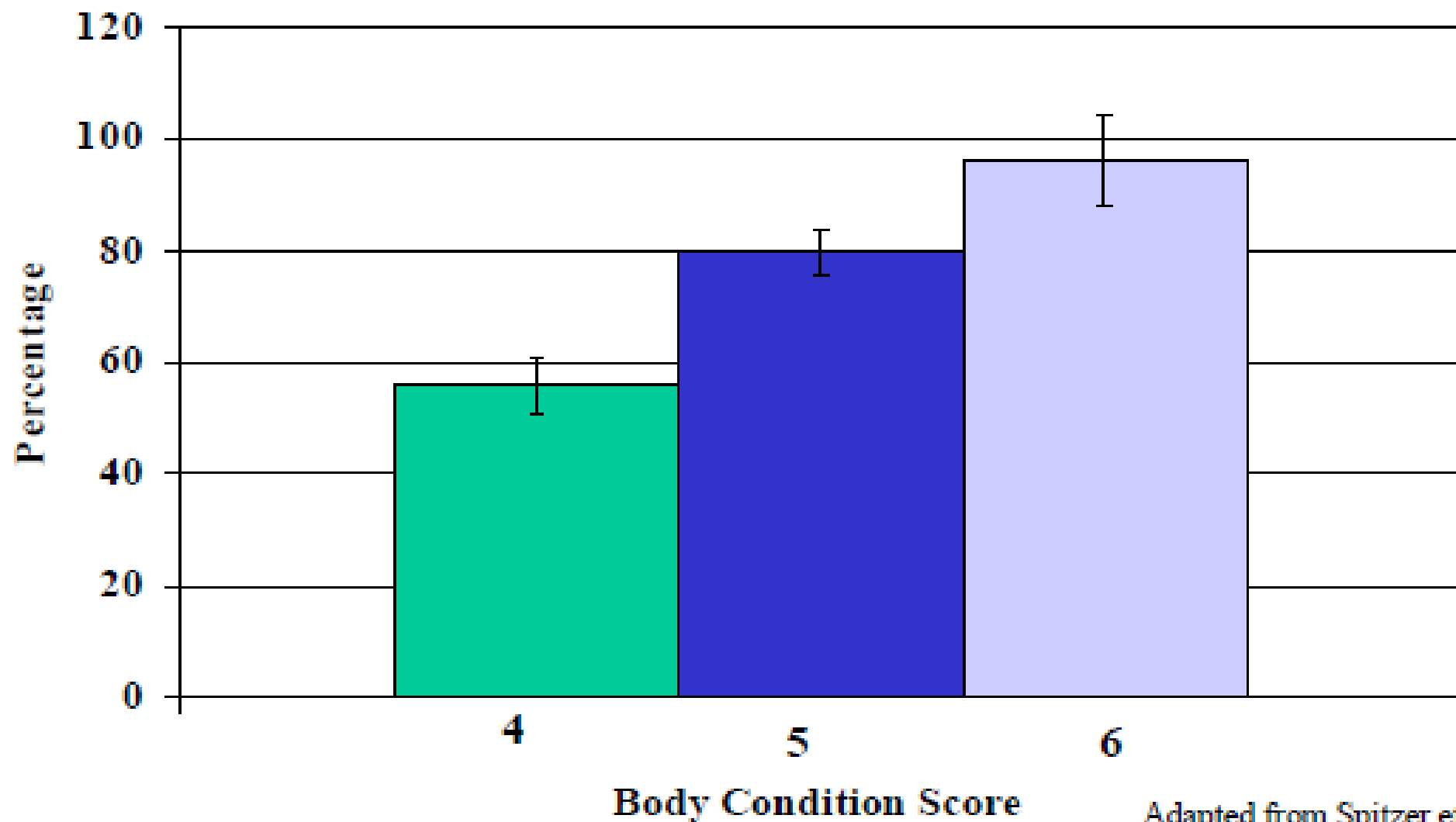
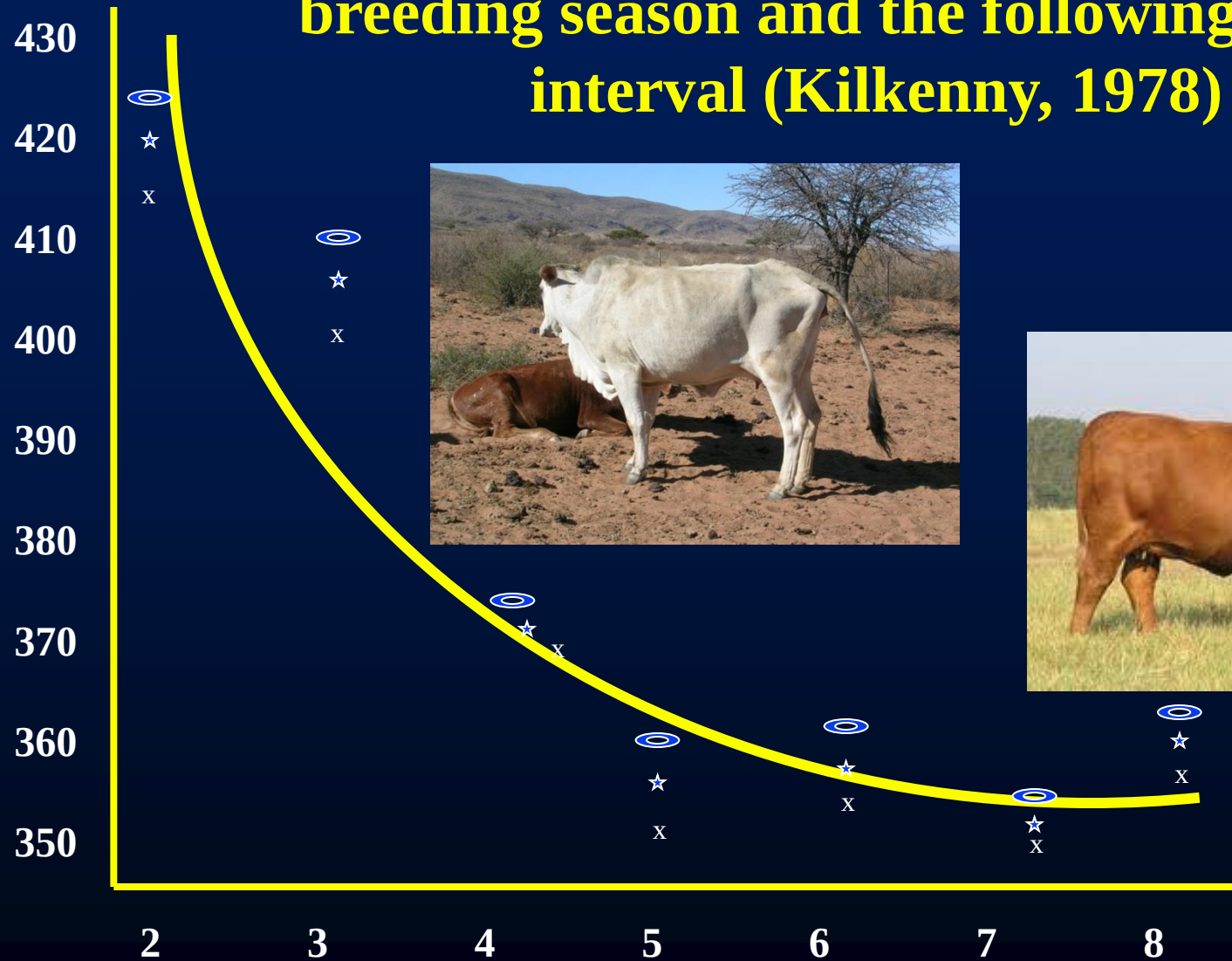


Table 1. Effect of Body Condition Score at Calving on Cumulative Pregnancy Rates

		Day of the Breeding Season		
	BCS	20 d	40 d	60 d
Mature Cows (Richards et al., 1986)		Cumulative % Pregnant		
	≤ 4	41	67	84
	≥ 5	51	79	91
First Calf heifers (Spitzer et al., 1995)		Cumulative % Pregnant		
	4	27	43	56
	5	35	65	80
	6	47	90	96

Relationship between body condition during the breeding season and the following calving interval (Kilkenny, 1978)

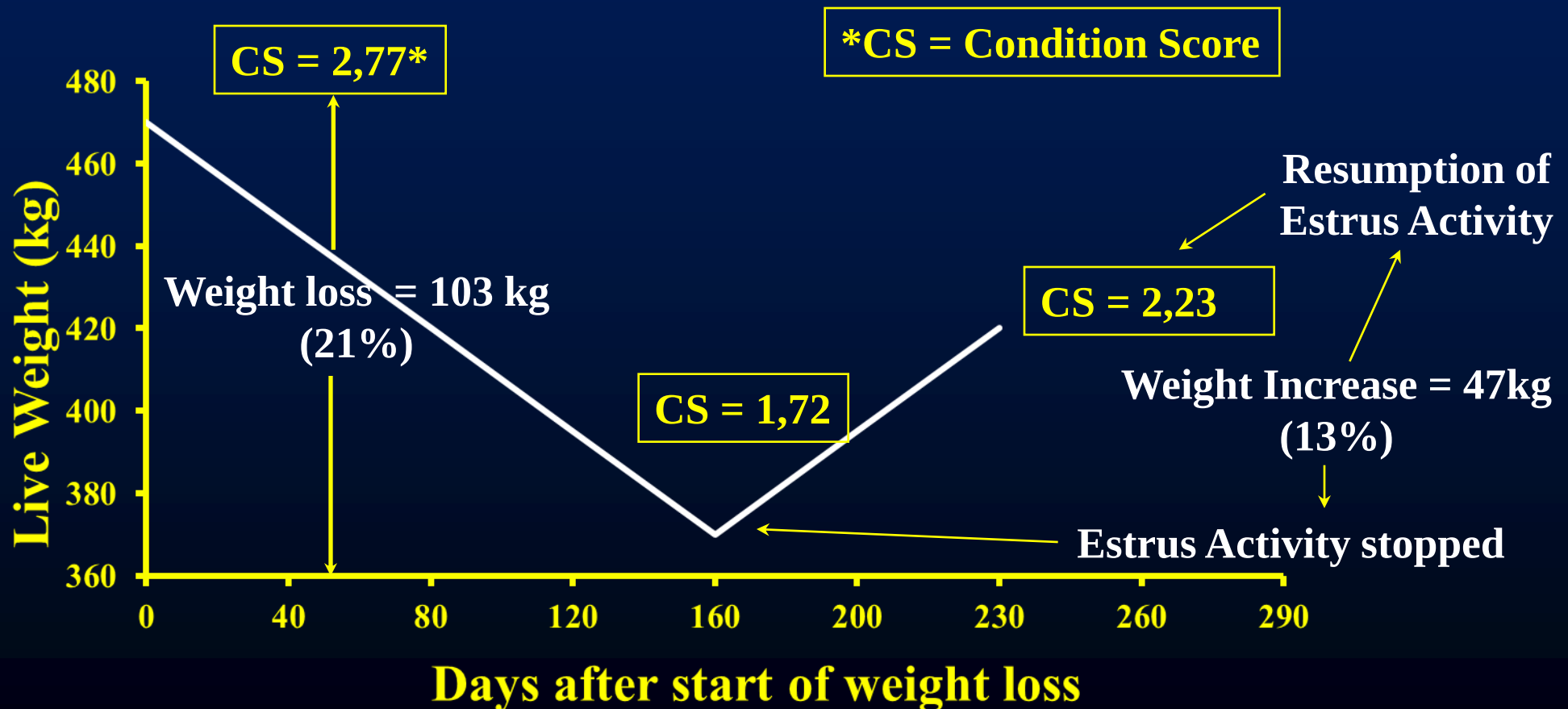
Calving interval (days)



Body condition (1-9 scale)

EFFECT OF WEIGHT LOSS ON ESTRUS-ACTIVITY IN BEEF CATTLE

(Adapted from Louw, Thomas & Lishman, 1988)



±35-40kg body weight loss = 1 BCS loss (scale 1-9)

Economic feeding strategy of the breeding cow

- Producers can save financially and future reproductive failures will be prevented if there is a clear understanding of:
 - the production cycle of the cow
 - the cow's nutritional needs
 - impact of different nutrients on performance
 - how to manipulate the diet
 - composition of the diet (feed analysis)
- Strategic feeding to obtain ideal condition scores and maximize reproductive performance can then be achieved



Economic feeding strategy of the breeding cow

- Regardless of the scoring system or monitoring system, it is important to understand:
 - when cows can be maintained on a decreasing plane of nutrition
 - when they should be maintained on an increasing plane of nutrition
 - when cows can be kept on a maintenance diet

Production cycle of a beef cow emphasizing important nutritional and reproductive requirements

Production Cycle of the Cow

Weaning

I	II	III	IV
Mid gestation	60-90 days precalving	Calving to rebreeding	Breeding to weaning
Maint.	Maint.	Maint.	Maint.
	Rapid fetal growth	Lactation	Lactation
	Prepare for lactation	Regain wt loss	
		Repair Repro. tract	

Period 1 - Shortly after weaning - Mid Gestation

- **Period at which producers can manipulate the diet to either increase or decrease a cow's condition**
- **Cows require very little in terms of nutrients to maintain their metabolism**
- **If cows are in poor condition there is no better stage to adjust a cows feed regimen to increase her condition**
 - **Supplementation before calving can have a larger impact on pregnancy % than supplementation after calving (Marston et al., 1995)**

Production cycle of a beef cow emphasizing important nutritional and reproductive requirements

Production Cycle of the Cow

Weaning
↙

I	II	III	IV
Mid gestation	60-90 days precalving	Calving to rebreeding	Breeding to weaning
Maint.	Maint. Rapid fetal growth Prepare for lactation	Maint. Lactation Regain wt loss Repair Repro. tract	Maint. Lactation

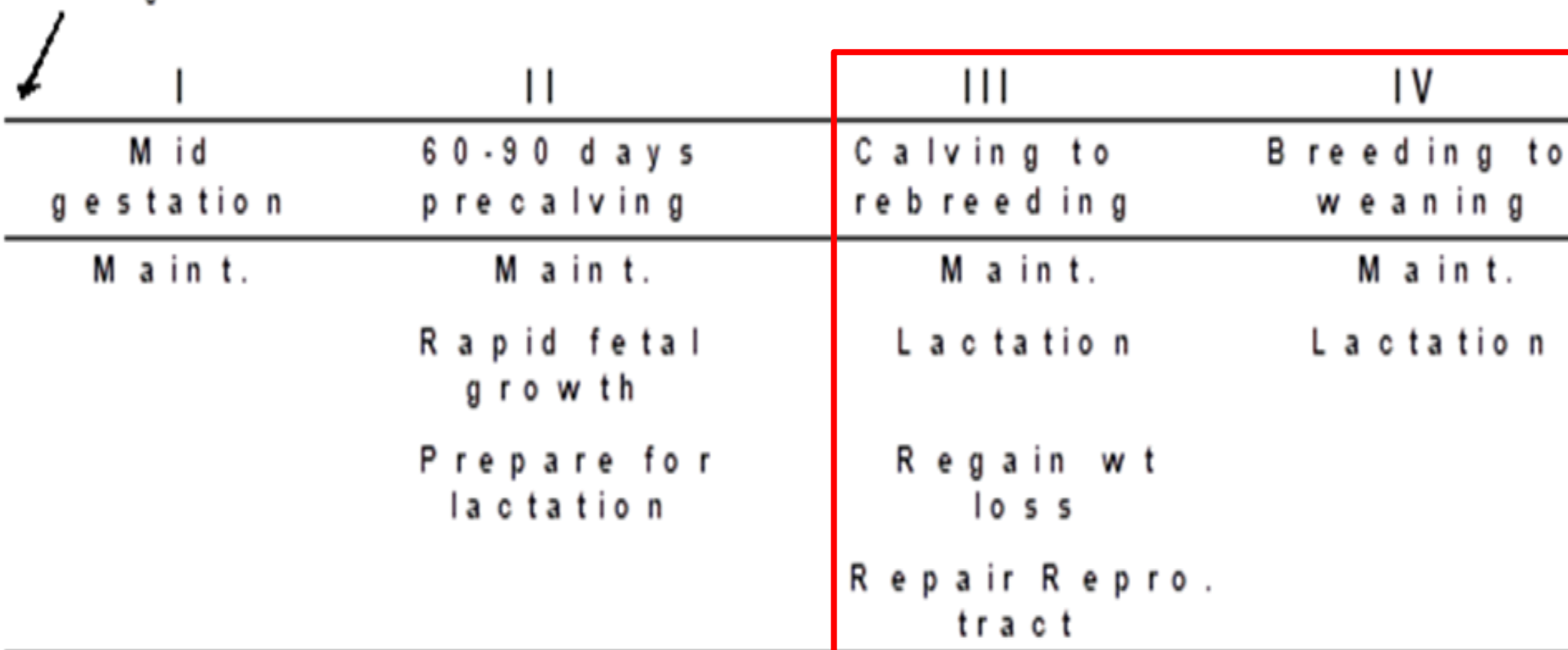
Period 2 – 60 to 90 days precalving

- Fetus begins to grow rapidly
 - up to 0,5kg of gain a day shortly before parturition
- Cows also require several other physiological mechanisms to occur to prepare a cow for lactation
- Therefore, adjusting a cow's condition requires more feed
 - very often occurs during the worst part of winter when feed quality tends to be poorer and supplementation becomes expensive

Production cycle of a beef cow emphasizing important nutritional and reproductive requirements

Production Cycle of the Cow

Weaning



I	II	III	IV
Mid gestation	60-90 days precalving	Calving to rebreeding	Breeding to weaning
Maint.	Maint.	Maint.	Maint.
	Rapid fetal growth	Lactation	Lactation
	Prepare for lactation	Regain wt loss	
		Repair Repro. tract	

Period 3 – Calving to rebreeding

- The period of greatest nutritional need
 - Shortly after calving
- Required to:
 - Produce milk for a growing calf
 - Regain any weight lost shortly before and after parturition
 - Repair her reproductive tract in order to become pregnant within three months after birth
- During this stage a cow usually is consuming as much feed as she can to support herself
- Adjusting condition at this stage often is futile

Period 3 cont. – Calving to rebreeding

- Cows usually are grazing and tend to consume their full protein, vitamin and mineral requirements
 - however, the grass is often lush with a high percentage of moisture
 - occasionally can cause a deficiency in energy

Period 4 – Lactation

- Requires the majority of nutrients
- Condition can be manipulated with some innovative feeding practices

Impact of specific nutrients on reproductive performance

- **Insufficient intake of energy, protein, vitamins, and micro- and macro minerals have all been associated with suboptimal reproductive performance**

Economic feeding strategy of the breeding cow

- **Maximum use of nutrients in natural and established pastures/ stover/hay/silage**
 - **Supplementation must complement roughage source**
 - **Critical to understand the effect of supplemental nutrients on the intake and digestion of the roughage source**
- **Low quality roughage – goal is to increase intake and digestion**

Supplemental nutrition on dry pastures

-May to 3 weeks after first good rain-

- Usually Period 1, 2 and part of Period 3
- **Dry pastures, standing hay, stubbles, stover**
 - Insufficient protein – first limiting
 - **Insufficient protein for rumen microbes, especially where no green material is present**
- Low digestibility
 - **Low intake**
 - **Low animal production**



Protein supplementation



Protein supplementation on low quality pastures

- “First” limiting nutrient on low quality pastures
- Protein used by the rumen microbes rather is the first limiting nutrient within winter maintenance supplements
 - **Rumen Degradable Protein (RDP)**
 - Not Total Protein

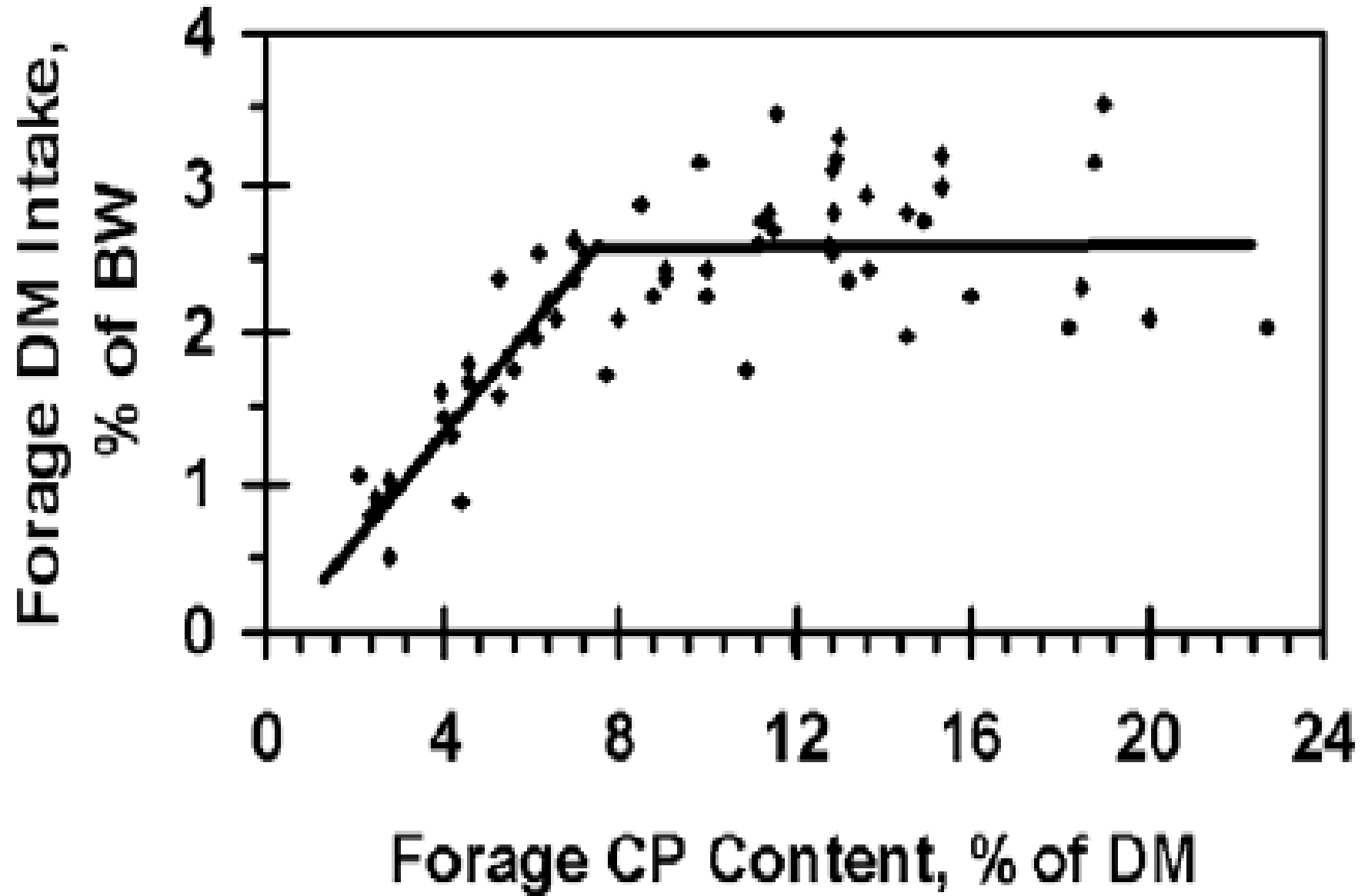
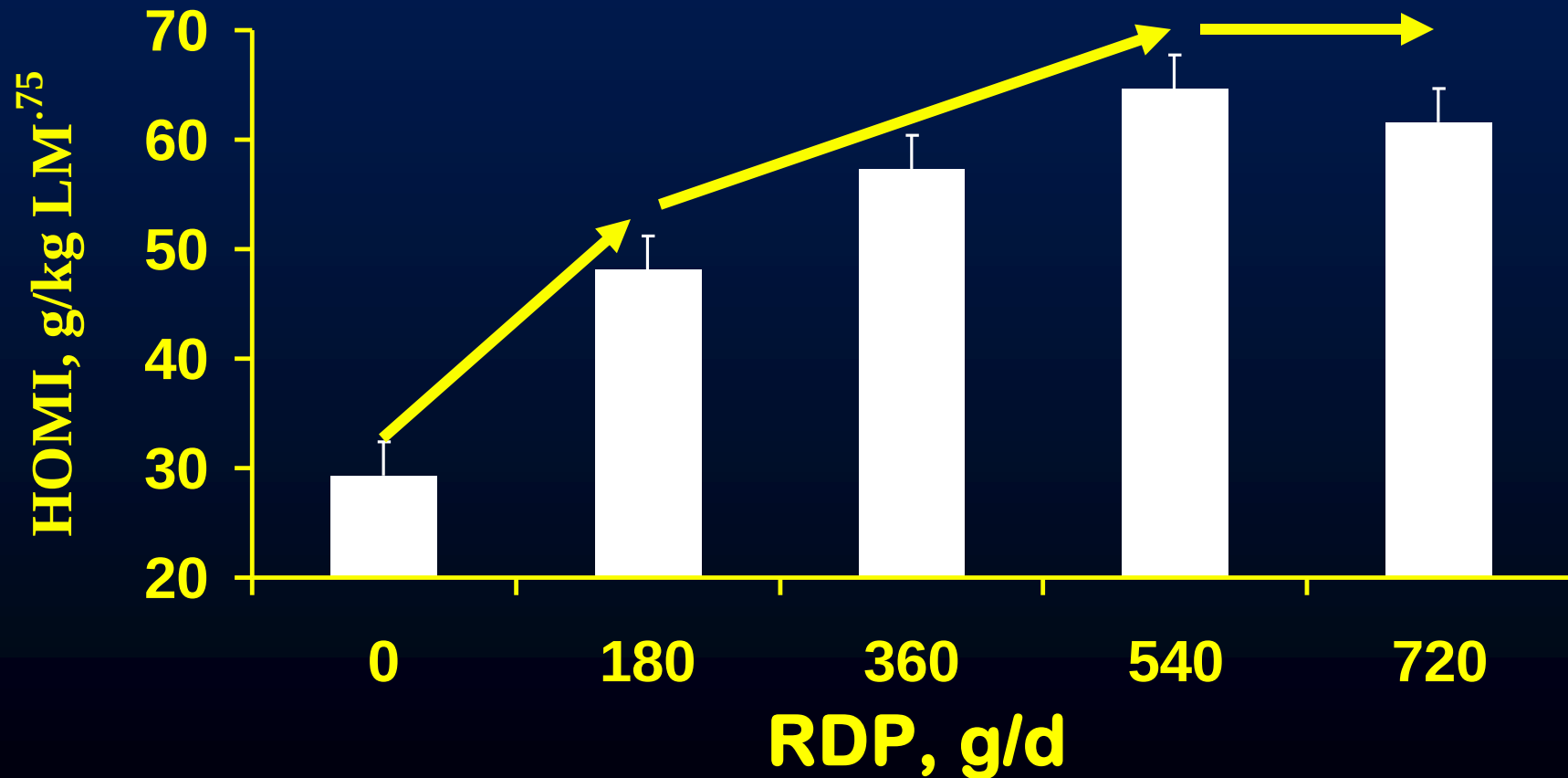
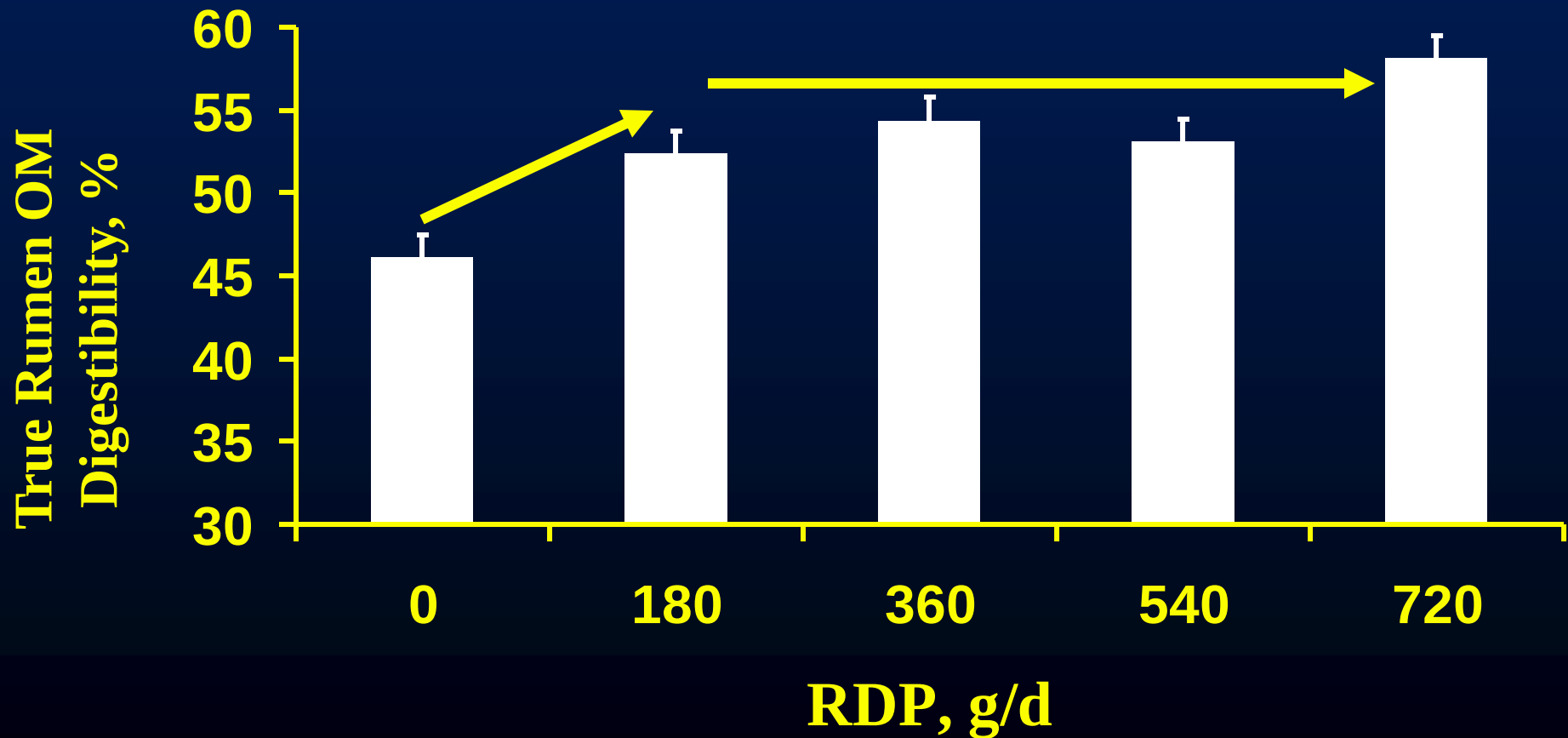


Figure 1. Effect of forage crude protein (CP) on dry matter (DM) intake

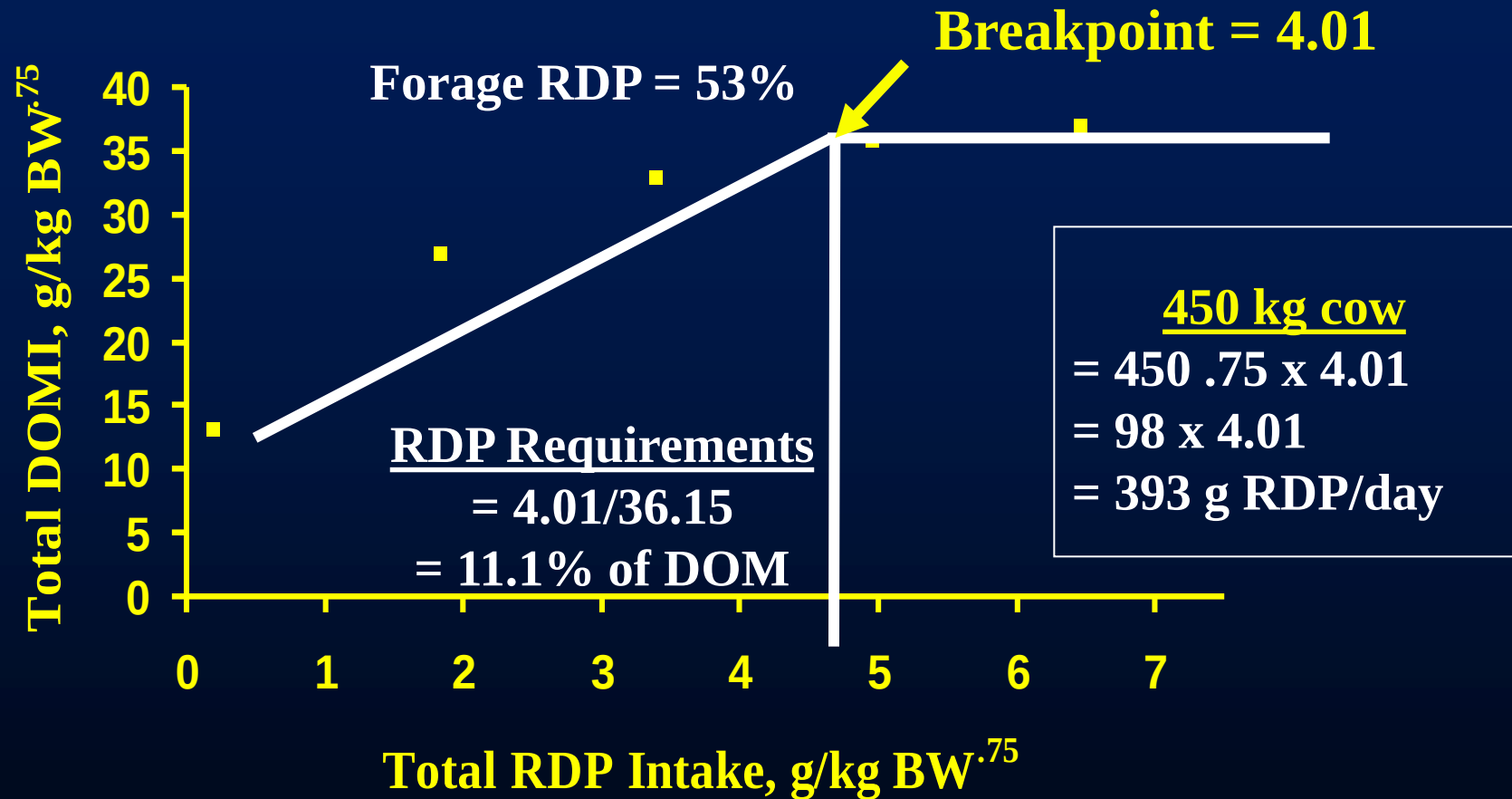
Effect of Increasing Rumen Degradable Protein on Forage OM Intake (Köster, 1996)



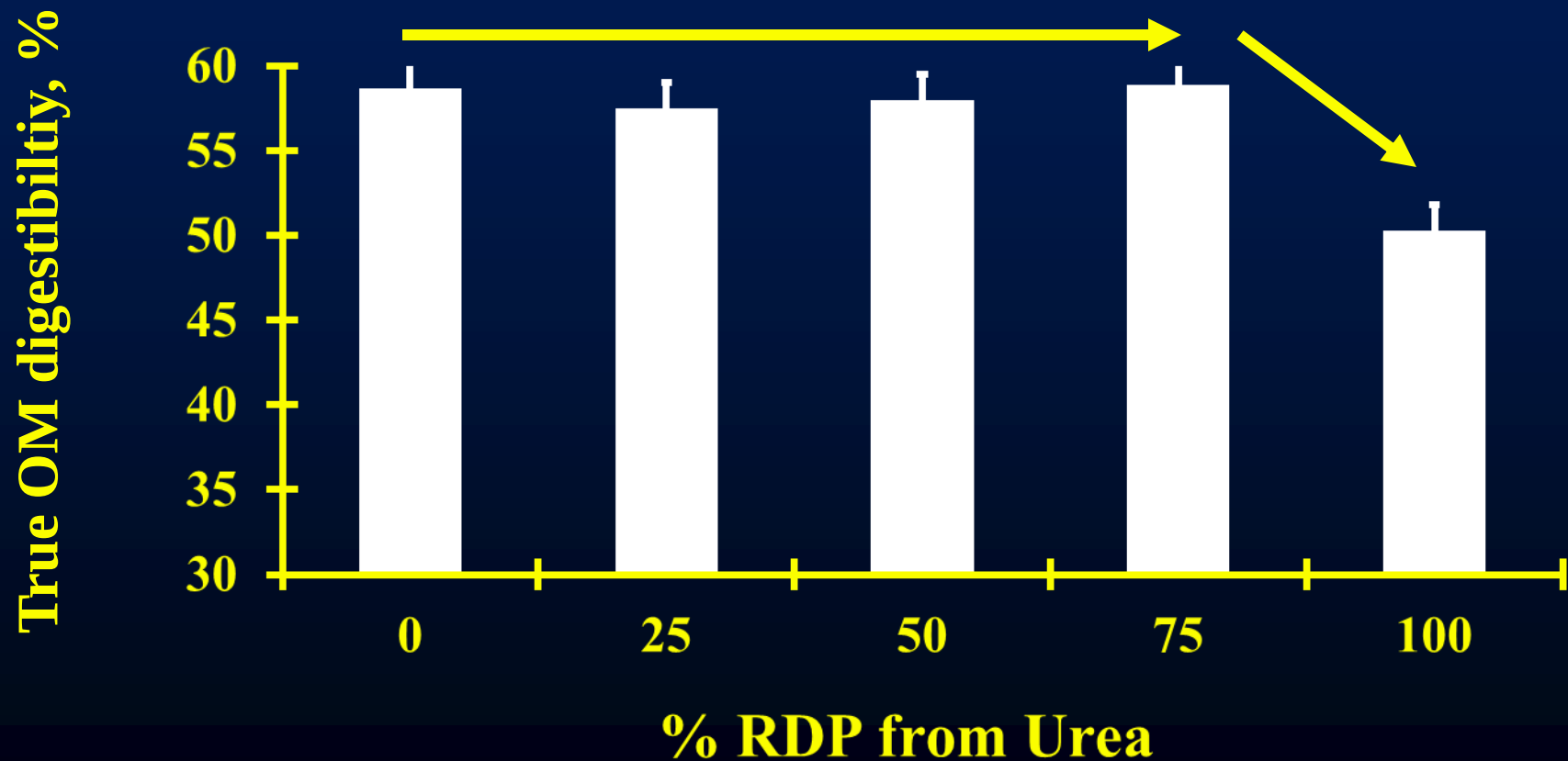
Effect of Increasing Rumen Degradable Protein on Ruminal OM Digestion (Köster, 1996)



Estimating RDP Requirements using the One Slope, Broken-Line Model (Köster, 1996)



Effect of different levels of urea on digestibility of hay in the rumen – Cattle (Köster, 1993-1995)



RDP requirements and supplementation of beef cattle on low quality grazing

- **Assumption:**

- Type of animals: Dry pregnant cows
- Weight of cows: 450 kg
- Pasture quality: 3.5% Crude protein (As Is basis)
- Degradability of protein of grass: 53%
- Grass intake: 2.1% of body weight (As Is basis)

- **Requirements:**

- $450^{0.75} \text{ kg} \times 4.01 = 97.7 \times 4.01$
= 392 g total RDP/cow/day

RDP requirements and supplementation of beef cattle on low quality grazing

- **RDP from grass:**
 - Grass intake (as is) = $450 \text{ kg} \times 2.0\% = 9.0 \text{ kg}$
 - Crude protein intake from grass = $9.0 \text{ kg} \times 3.5\% = 315\text{g}$
 - RDP intake from grass = $315 \text{ g} \times 53\% = 167 \text{ g}$
- **RDP that is supplemented from lick to assure optimal intake of the grass:**
 - 391 g total RDP/cow/day - 167 g RDP from grass
= 224 g RDP/450 kg cow/ day from lick
 - = $224 - 150 = 74$ gram RDP shortage if minimum levels from Feed Act 36/1947 are used as guideline

Urea supplementation of beef cattle on low quality pastures

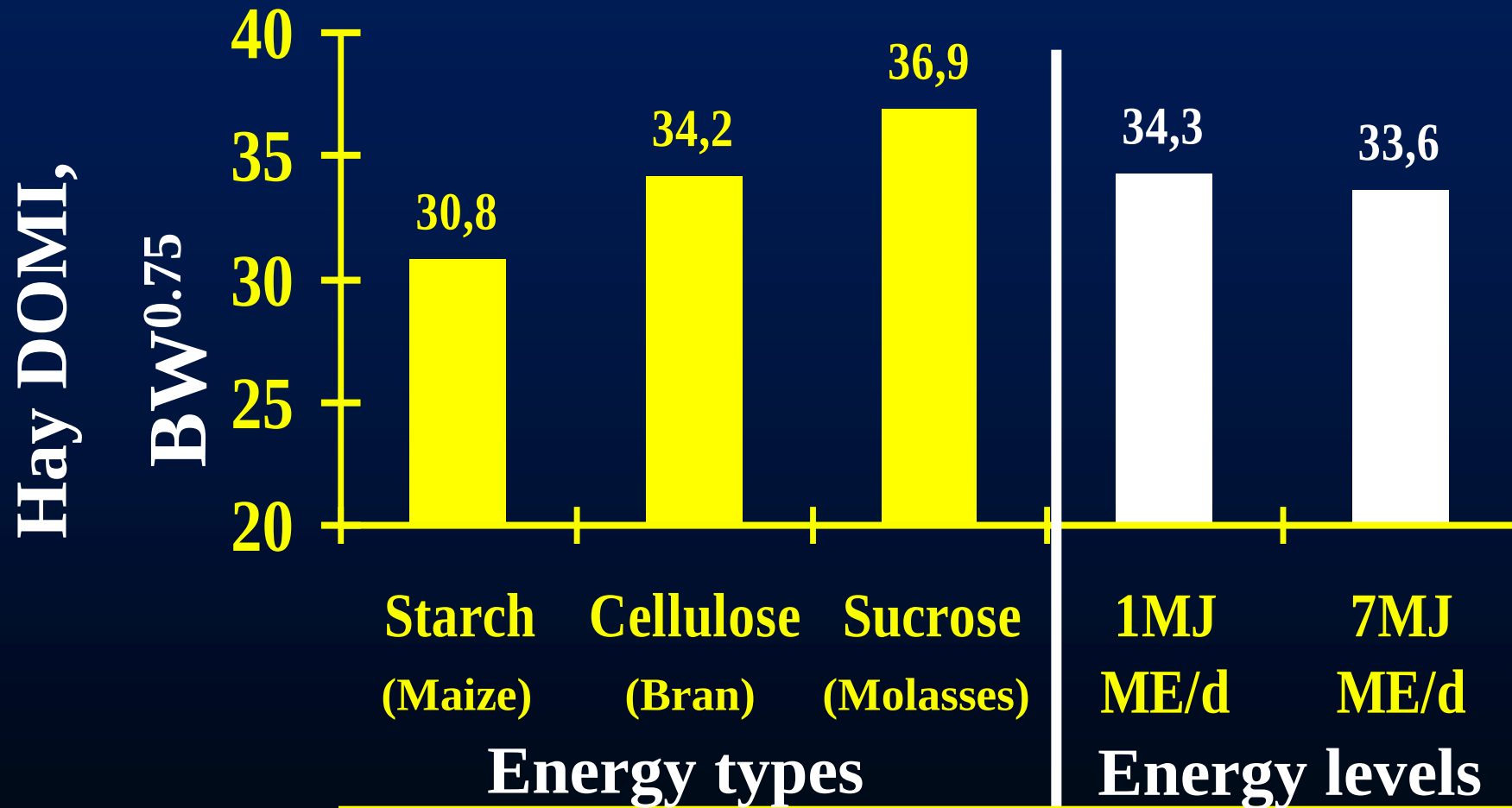
- **Current South African commercial winter maintenance lick**
 - 45-55 gram urea per cow per day (irrespective of live weight)
- **New recommendations**
 - 60-70 gram urea per 450-kg cow per day
 - 40-60 gram RDP from true protein (eg oilcakes) per 450-kg cow per day = 100 – 150g oilcake per day



Energy supplementation



Effect of different types and levels of energy on digestible OM intake of low quality hay (Le Roux, 2002)



$$\text{RDP} = 4.67 \text{ g/kg BW}^{0.75}$$

Energy supplementation on natural grazing

- No grain supplementation if:
 - Goal of supplementation is to only achieve better utilisation of lower quality pastures
 - Pastures must have sufficient energy though for maintenance
- Feed grain and other energy sources if:
 - Goal of supplementation is to achieve additional production above maintenance on pastures
 - Production licks and limited concentrates

Table 2. Effect of pre- or postpartum dietary energy or protein on pregnancy rates in cows and heifers

Nutrient and time	Adequate	Inadequate	Difference, %
	Pregnant, %		
Energy level pre-calving ^a	73	60	13
Energy level post-calving ^b	92	66	26
Protein level pre-calving ^c	80	55	25
Protein level post-calving ^d	90	69	21

^{abcd} Combined data from 2, 4, 9 and 10 studies, respectively.

Energy supplementation on natural grazing

- Production licks and limited concentrates
 - Cows with calves (at least until rebreeding)
 - Definitely in winter
 - Dry pregnant cows at any stage not in optimal body condition (at least 60-90 days before calving)
 - First-calve heifers
 - Growing animals (manage intakes to achieve ADG targets)

Mineral and Vitamin supplementation



Minerals

Minerals are divided in two groups:

Macro minerals (>100 ppm)

- Essential for all physiological systems
- Larger amounts required especially for growth (bones, teeth) immunity, enzyme functions nerve transmissions, water balance in the cells, etc.
 - Calcium, phosphorous, magnesium, potassium, sodium, choline and sulphur
- Subclinical shortages biggest problem
 - Don't see symptoms

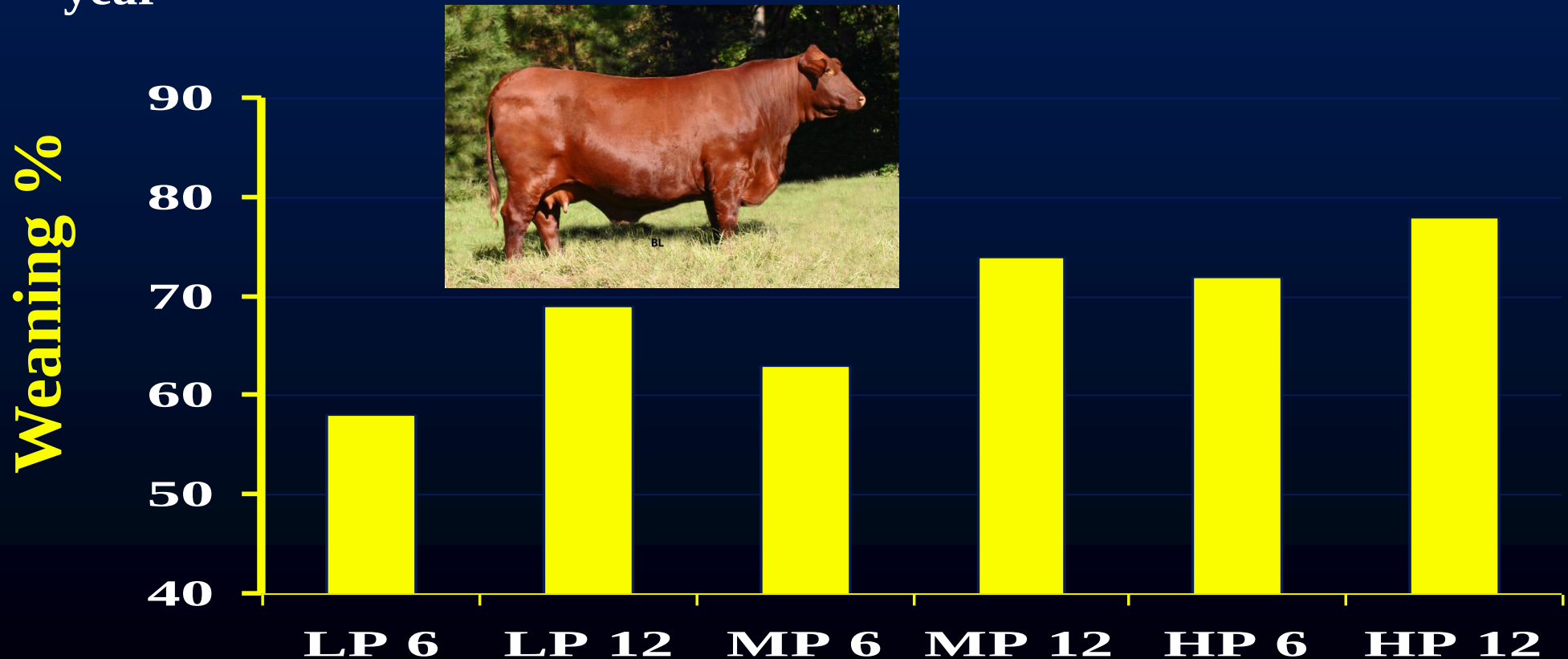
Phosphorous (P)

- Most common mineral shortage
- Marginal P-shortage more important than acute shortage - subacute
 - Leads to non-visible production losses
 - Decreased reproduction, milk production
 - Decreased growth

Average weaning percentage of cows consuming different levels of phosphorous (De Waal et al., 1996)

LP 6, MP 6, HP 6: Low, medium and high levels of P for 6 months/year

LP 12, MP 12, HP 12: Low, medium and high levels of P during the whole year



P-SUPPLEMENTATION – “ON PASTURES”

-General guidelines-

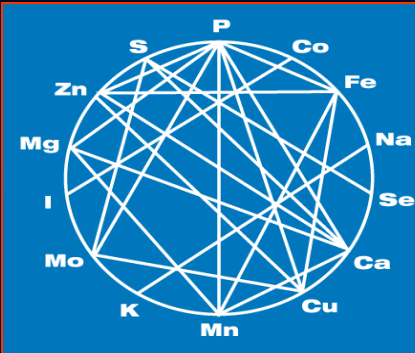
MAINTENANCE	6g/ANIMAL/DAY
YOUNG GROWING ANIMALS	9g/ANIMAL/DAY
LATE PREGNANCY FEMALES	9g/ANIMAL/DAY
COWS WITH CALVES	12g/ANIMAL/DAY

Trace minerals



Micro- or Trace minerals (<100 ppm) important in animal health and production

- Much smaller quantities required and used all over body
- **Essential trace minerals:**
 - Cu, Mn, Zn, Se, I, Co, Fe, Cr, Mo, F, Si, Vd, Ni, Sn, As
 - Cows – especially 4 weeks before calving and breeding
 - Bulls
- **Problems with trace minerals occur due to mineral interactions in the rumen**
 - Ratios are critical



Vitamins

- Supplementation before and after calving can increase conception rates (Hess, 2000).
- Winter hay based diets or low quality grazing can become deficient in Vitamin A.
- Vitamin A deficiency does occur naturally in cattle grazing dry winter grazing or consuming low quality crop residues and forages (Lemenager, et al., 1991).
- Most of the vitamins (C, D, E, and B complex) are either synthesized by:
 - rumen microorganisms
 - the body (vitamin C)
 - are available in common feeds
 - not of concern under normal conditions

Key management strategies are:

1. Ensure sufficient energy is available to support reproduction

- **Body condition score cows and achieve BCS 5 in cows and BCS 6 in heifers by calving (latest) or 60 days before calving (preferred).**
- **Maintain cow body condition from calving through breeding for cows in proper body condition, and increase body condition in cows that are below optimal BCS at calving.**
- **Feed thin cows and 1st calf heifers in a separate group(s) from main herd.**
- **Provide energy supplementation from the most economical local source.**

Key management strategies are:

- 2. Provide optimum level of dietary protein**
 - **Provide sufficient Protein to the rumen bacteria for adequate rumen function**
 - **Avoid over supplementation of protein/urea**

- 3. Base mineral supplementation on forage mineral content and local deficiencies**
 - **Supplement P when needed**
 - **Pay attention to trace mineral levels especially Cu, Se, Mn, and Zn**

Conclusion

Careful daily attention to details and precision feeding is critical to the success of any profitable intensive beef cattle feeding program

Thank You





Raw materials and feed trends

Chrispen Sukume, Executive Administrator, LMAC

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Presentation to the Zimbabwe Herd Book

2026 Beef School

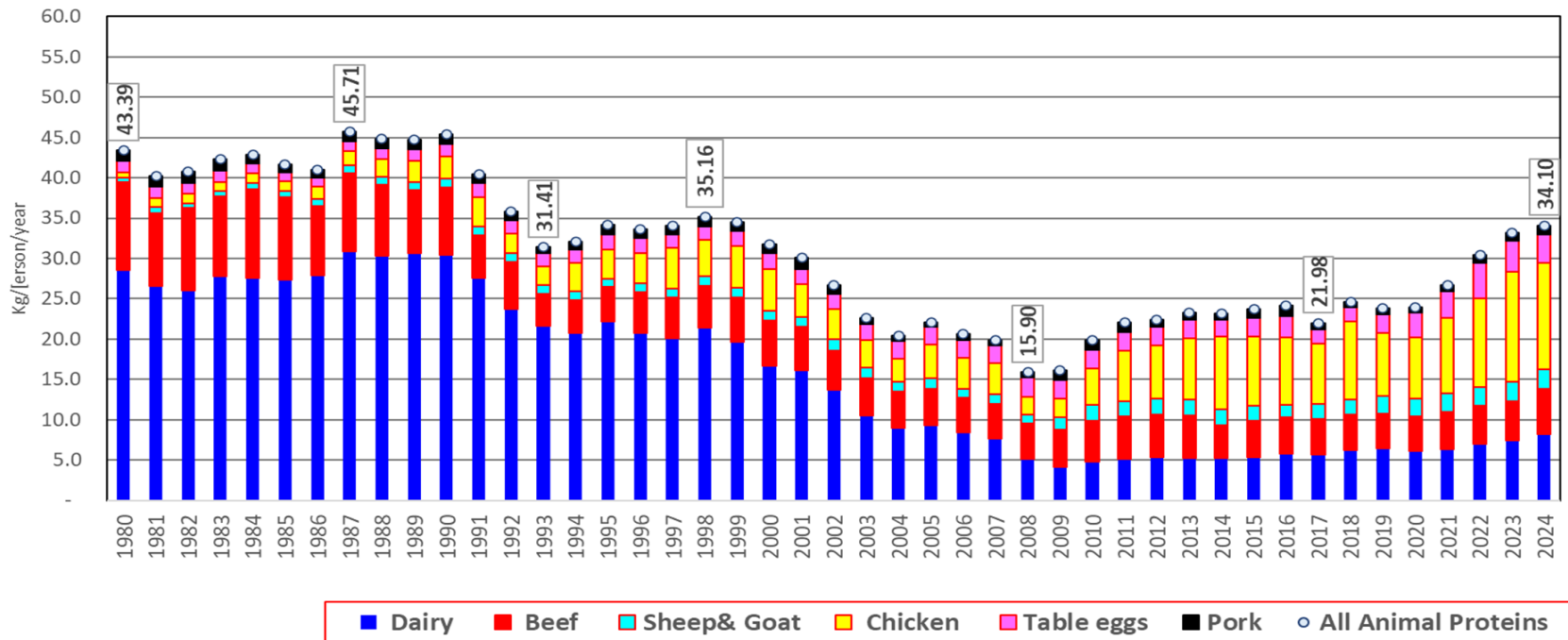
16th September 2026

Outline

- Some few points on beef in the livestock protein basket
- Overview of commercial beef compound feeds sector based on Stock feeds Manufacturers Association returns
- Trends in key ruminant feed raw materials, underlying drivers, and availability
- Structural changes in beef value chains due to recent tax policies
- Rise in on-farm feedlot operations as key driver of feed demand
- The rise in on-farm fodder production and harvesting
- The rise in use of non-conversional feed resources
- Policy issues LMAC is championing

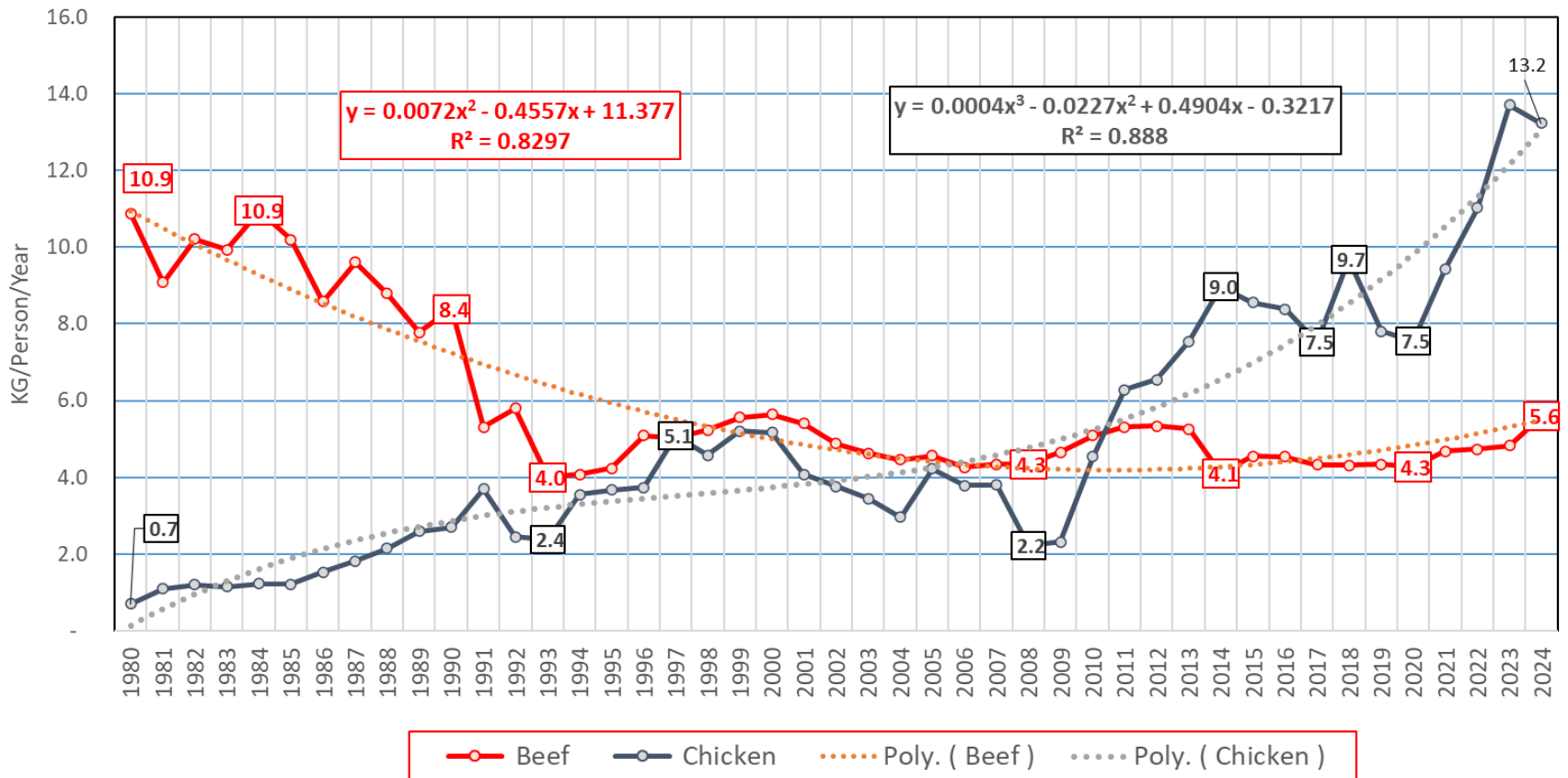
Declining livestock protein up to 2007..but increasing trend since

Trends in Total Domestic Per Capita Consumption of Animal Protein Products (1980-2024)



But most of growth in demand met by more rapid growth in chicken. Moderate growth in per capita beef ...4.3kg to 5.6kg over the past 2 years

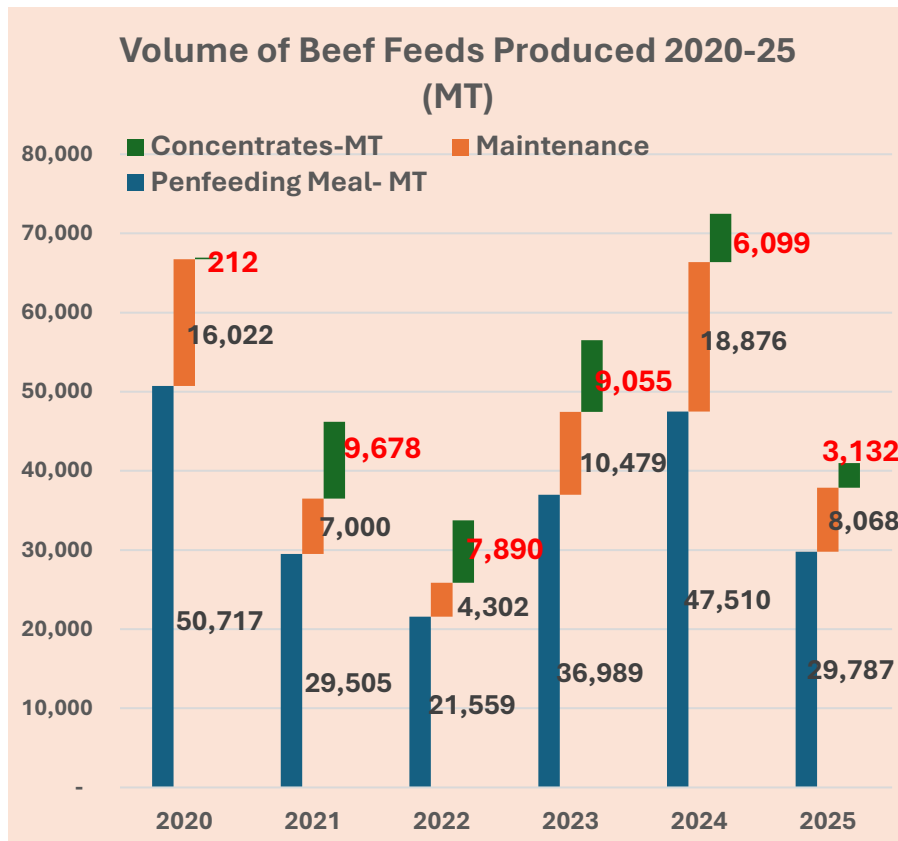
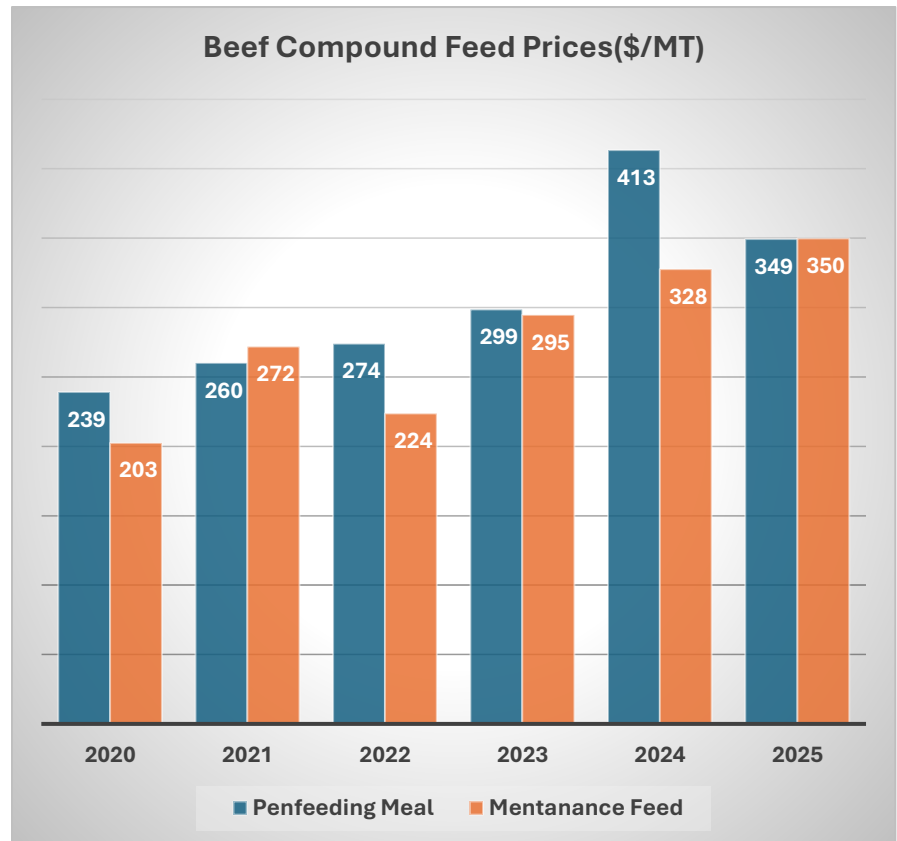
Comparison of Trends in Domestic per Capita Consumption of Beef and Chicken Meat (1980 - 2024)



Commercial Beef Feed Supply and Price Trends

Commercial beef feeds account for a small proportion(4%) of commercial feed production with most farmers dependent on natural veld and minimum supplementation during the dry months

Over the 2020-2025 period prices of beef feeds have been on a persistent rise due to raw material availability challenges outlined below....

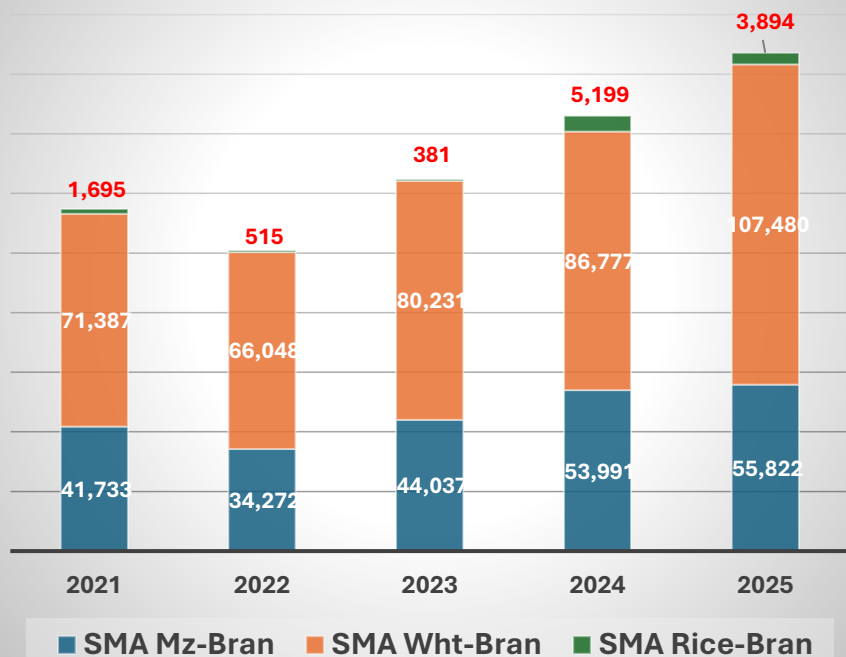


SMA Bran Usage and Price Trends

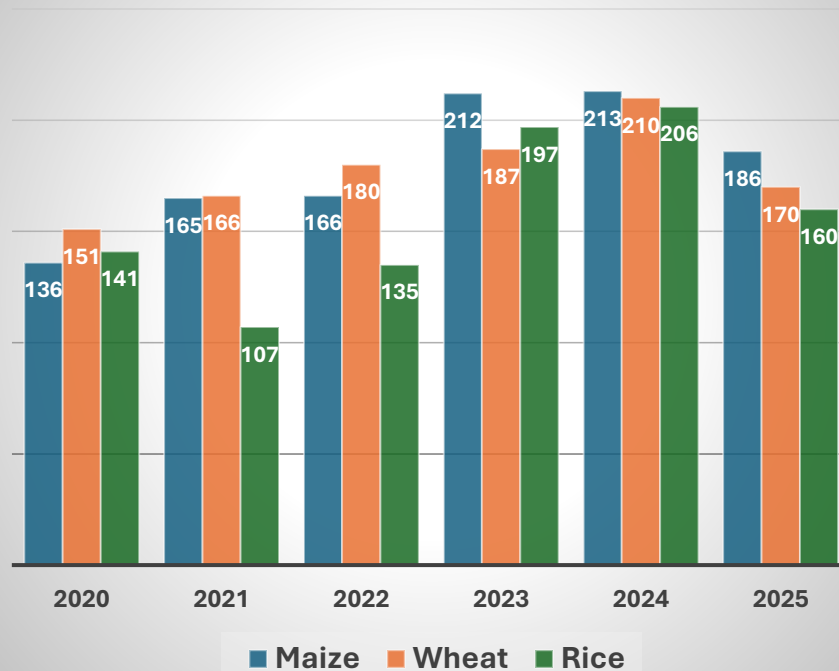
Due to high growth in production, wheat bran has been readily available for feed manufacture relative to maize bran which has been negatively impacted by toll maize millers

But prices of all brans have also been increasing partly due to drought induced increase in demand by beef, dairy, poultry and pig farmers. Imported rice bran usage, due to lower prices, has been on the increase among beef producers

Maize, Wheat and Rice Bran Usage by SMA Members (MT)

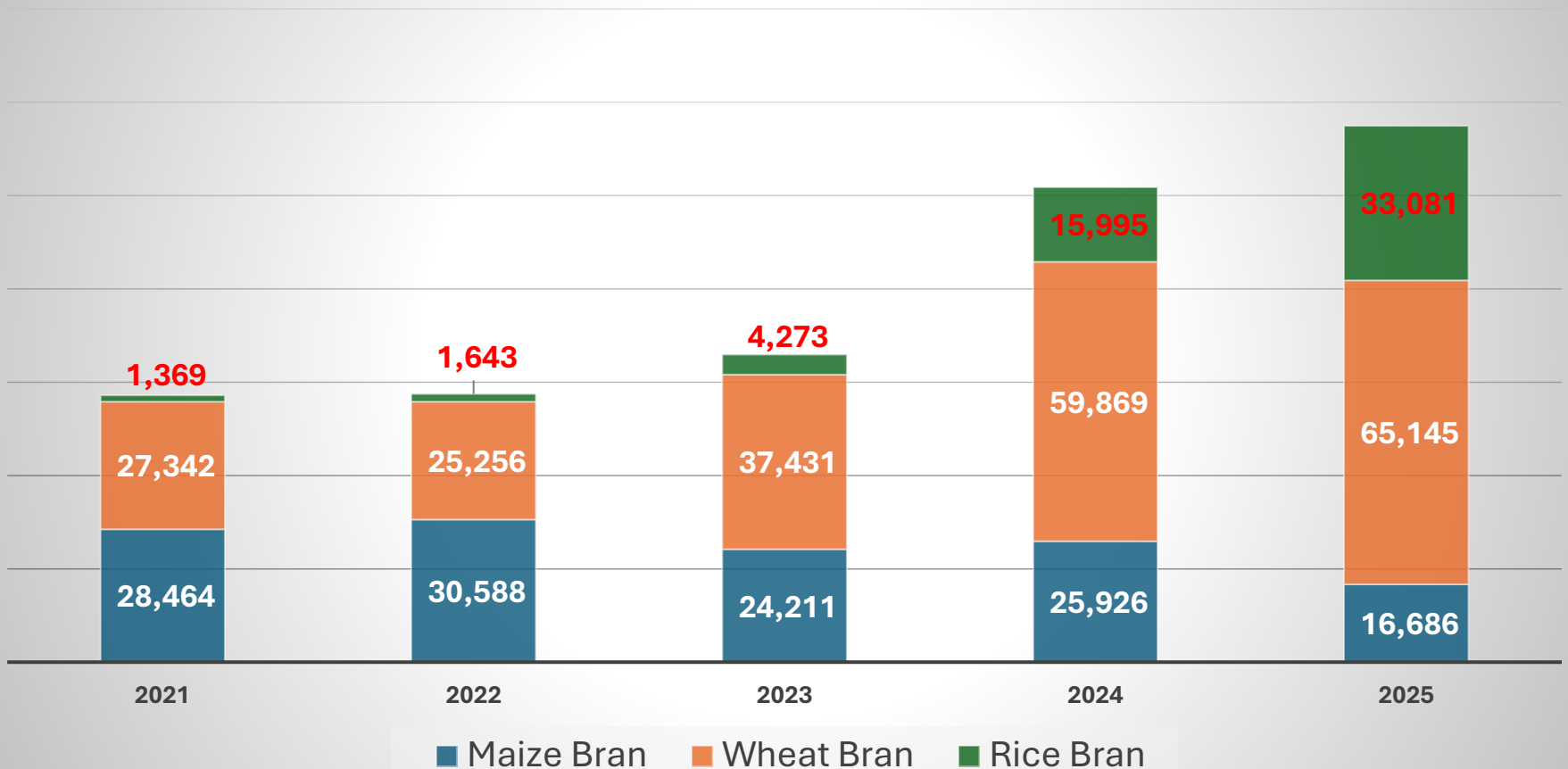


Brans Prices (\$/MT)



As a result, for on-farm livestock feed mixing farmers, there has been more rice and wheat brans, less maize bran on the open markets

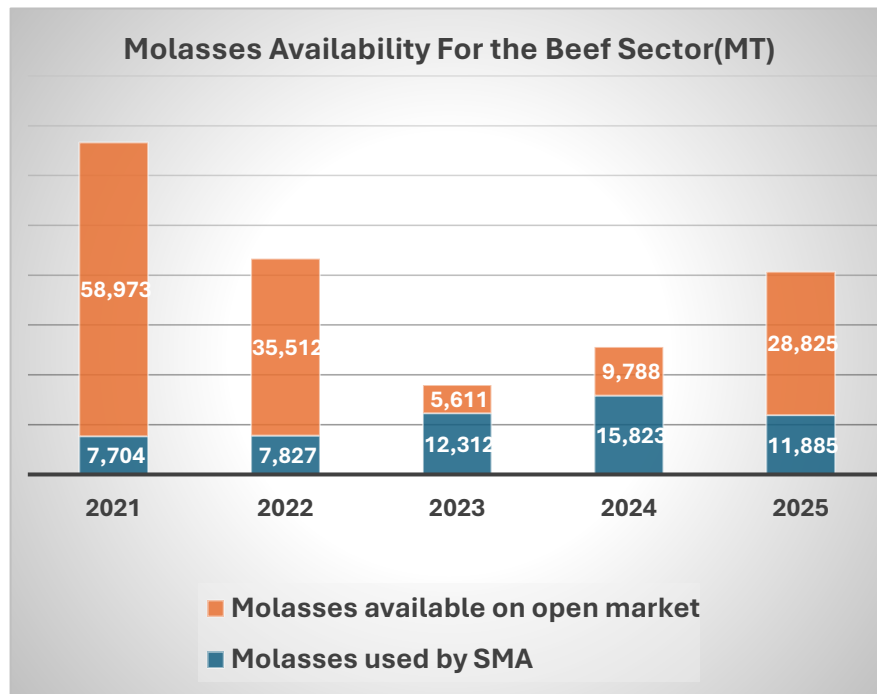
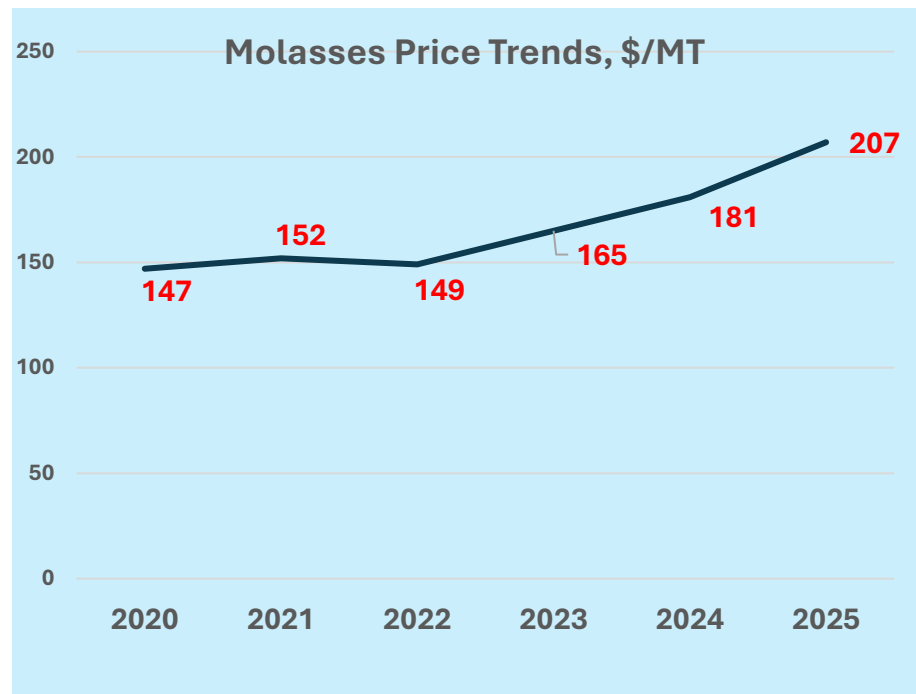
Estimated Brans Available on Open Market(MT)



There has been restricted molasses supply and higher prices due to.....

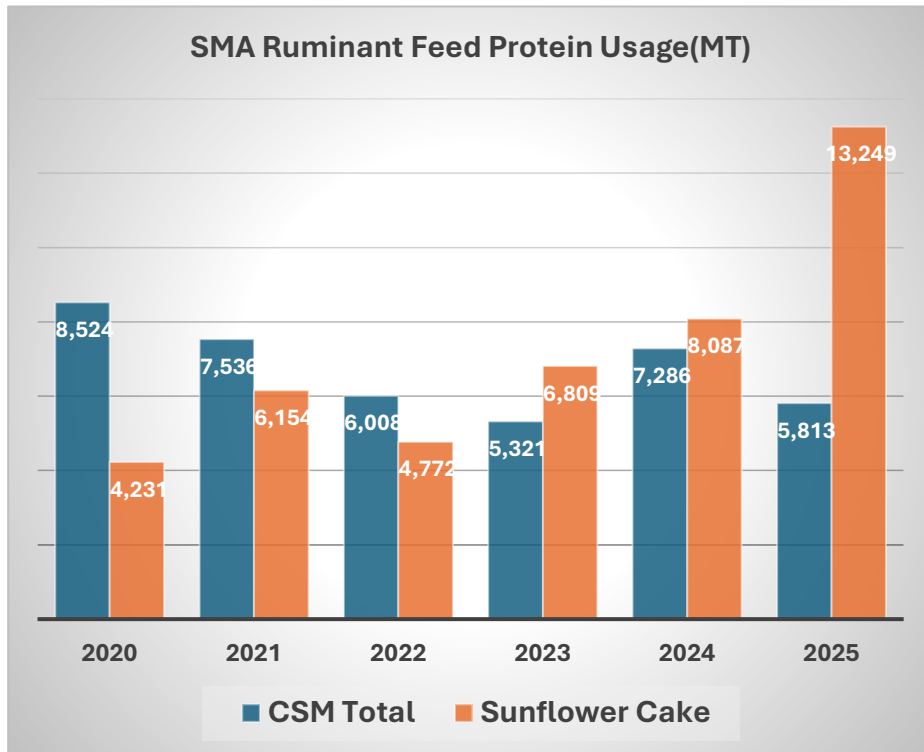
Prioritization of ethanol and competition from yeast producers

Resulting in 40% increase prices of molasses between 2020 and 2025

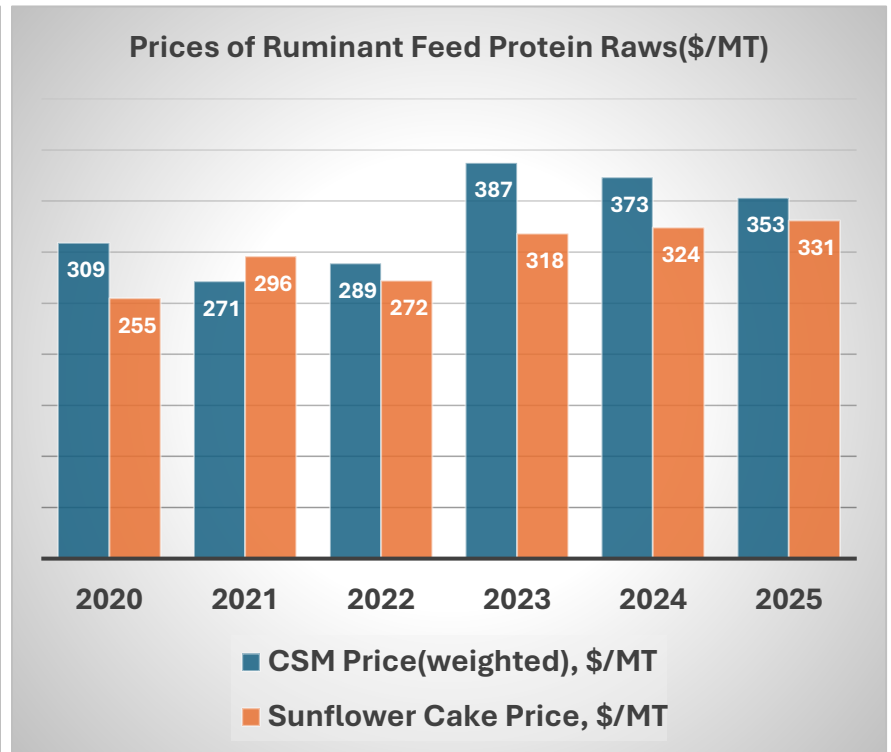


Protein Raw Material Supply and Price Trends

Due to declining cotton production and increasing sunflower production, SMA has been switching from over reliance on cotton cake towards sunflower cake

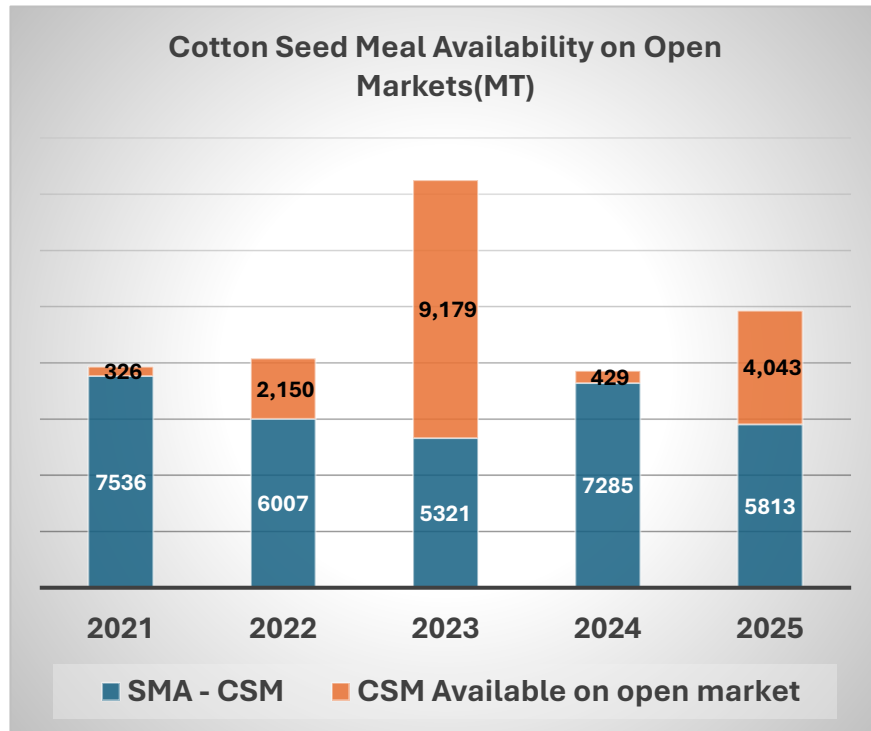


Low cotton production has led to increase in price of cotton seed meal in the past 5 years

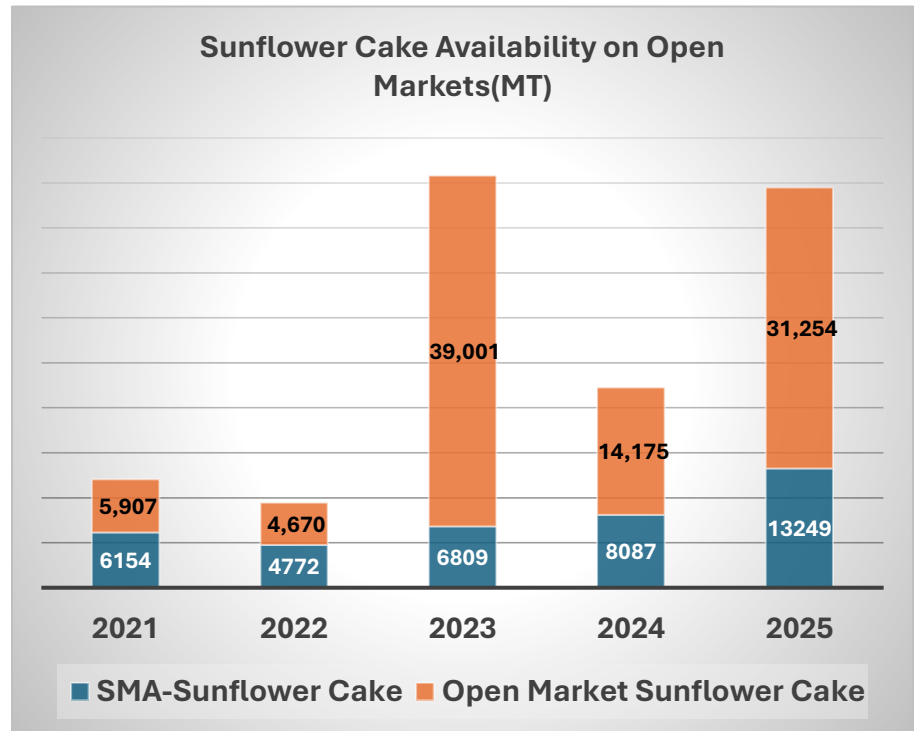


Increasing reliability of sunflower cake supply compared to cotton cake for on-farm mixers

Apart from 2023, very little CSM has been available for on-farm mixers

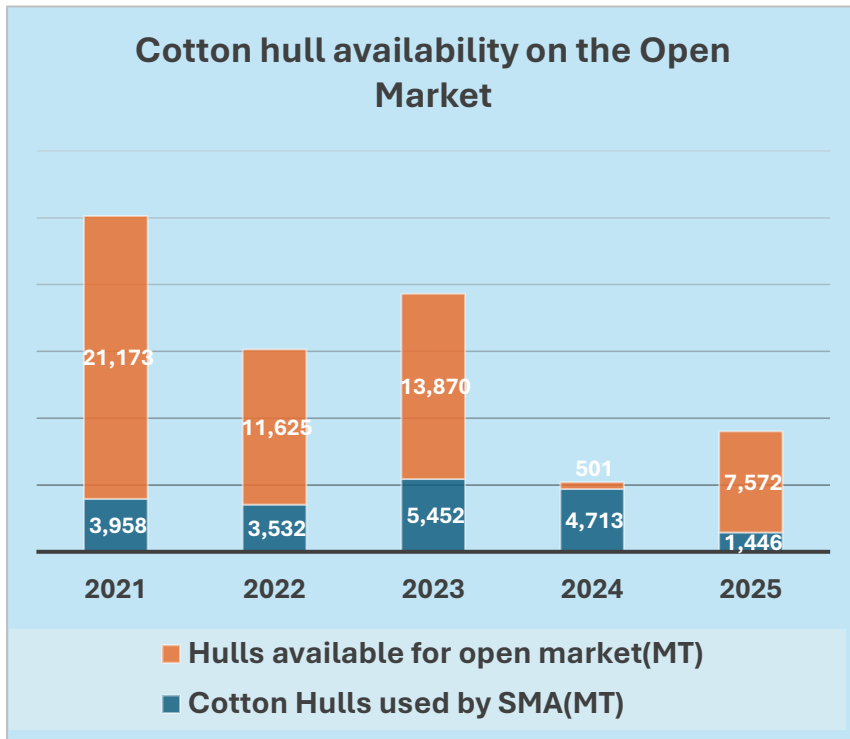


But based on local production and imports, sunflower cake was available especially for beef farmers willing to go to toll oil expressors in the main sunflower growing areas

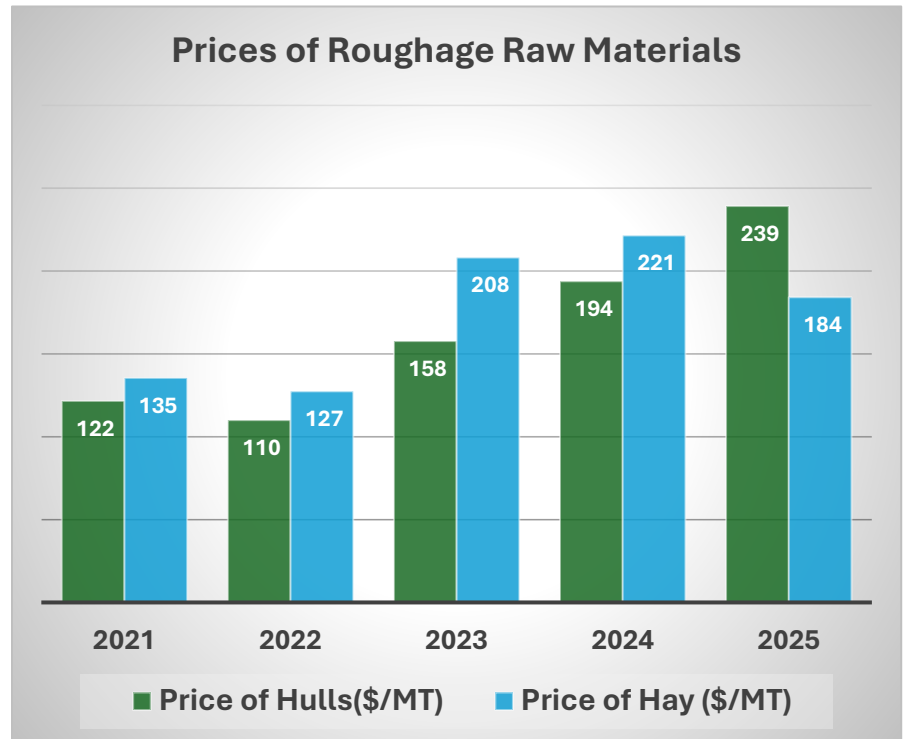


Roughage supply and price trends

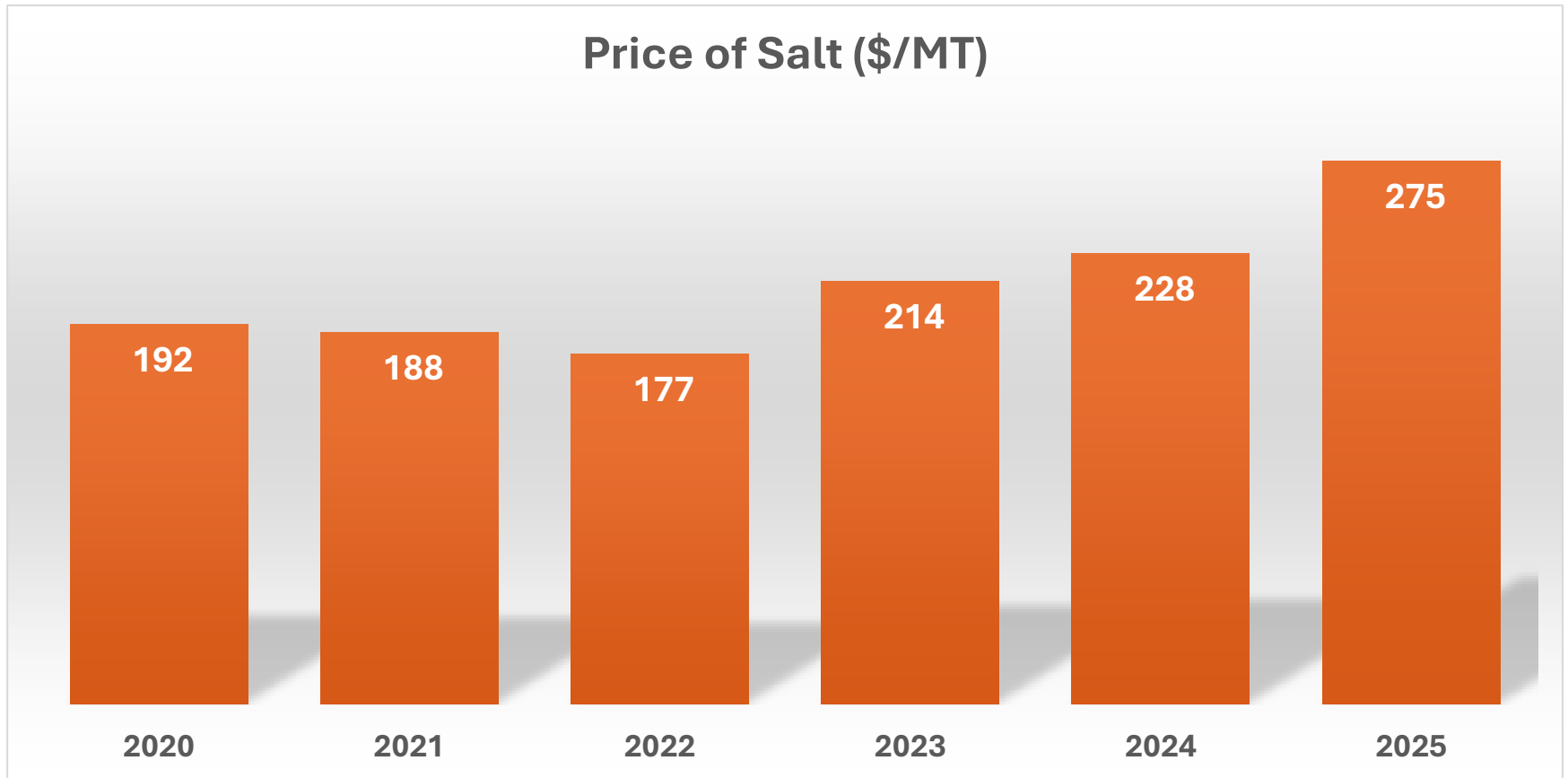
Due to low local cotton production, cotton hull availability in open markets has been declining over the past 5 years



This coupled with low rainfall has led to persistent increase in roughage(hulls/hay) prices. Average hay bales increased to \$3.30 in 2024



Salt costs rose from \$11.50 in 2020 to \$16.50 per 60kg- block in 2025



Structural changes in the beef value chain

Baseline Scenario (2023) – Beef Marketing Structure and Market Shares with beef zero VAT rated

2024 Q1 Summary of Beef Cattle Slaughters and Apparent Structural Changes in the Domestic Beef Market After standard VAT rating of beef

		Medium to Large Butcherie s	Many small butcherie s	Many micro meat vendors			Medium to Large Butcherie s	Many small butcherie s	Many micro meat vendors
Abattoir Type	Share of Carcasses	Licensed VAT Eligible VAT Registered	Licensed VAT Noneligible Not Registered	Not licensed Not eligible Not Registered	Abattoir Type	Share of Carcasses	Licensed VAT Eligible VAT Registered	Licensed VAT Noneligible Not Registered	Not licensed Not eligible Not Registered
Wholesaler Abattoir (VAT Reg)	62%	44%	18%	0%	Wholesaler Abattoir (VAT Reg)	39%	39%	0%	0%
Service Slaughter Abattoir (VAT Reg)	38%	10%	20%	8%	Service Slaughter Abattoir (VAT Reg)	61%	17%	29%	15%

Implications of Structural Changes to Beef Farming

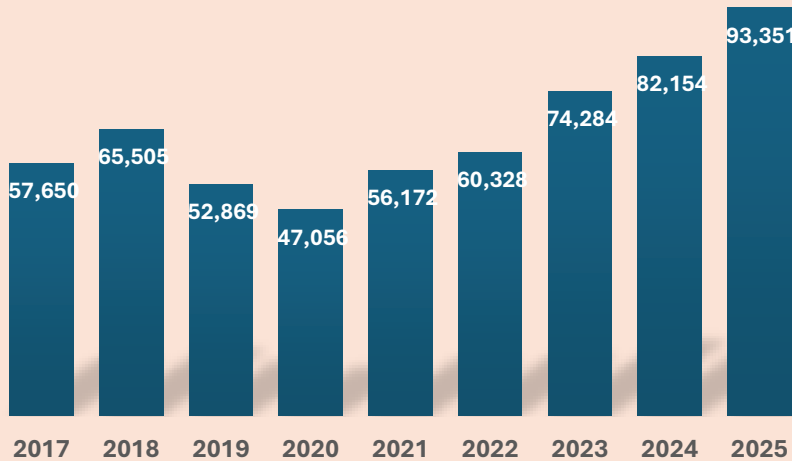
- Wholesaling abattoirs were obliged to charge VAT on purchases of live cattle from farmers as well as withholding VAT on sales of carcasses to retailers
- Medium to large scale butcherries who surpassed thresholds for VAT registration were in-turn obliged to charge VAT on meat sales to consumers
- This gave advantages to beef farmers to fatten their steers on-farm, toll slaughter at service slaughter abattoirs, and sell carcasses directly to informal micro meat vendors as well as small butcherries that do not surpass thresholds for VAT registration.
- Service slaughter abattoirs only need to collect VAT on service fees

Price differentials and structural changes to beef cattle marketing are driving increase in cattle fattening

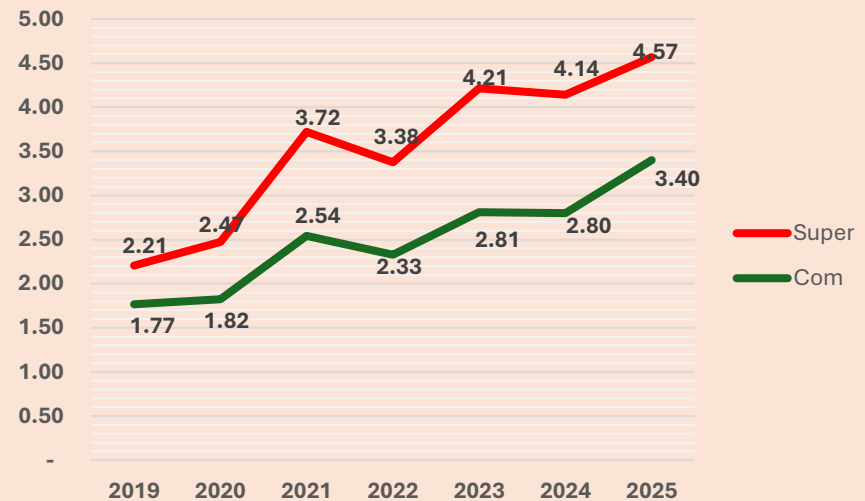
Super and Choice grade beef slaughters – reflecting pen-fed animals – doubled between 2020 and 2025

Driven by increasing gap between producer prices of Supers and Commercials from \$0.44/kg in 2019 to \$1.77/kg in 2025

Number of Super and Choice Grade Cattle Slaughtered



Beef Producer Price: Super vs Commercial Grades (\$/kg)



To mitigate high feed costs and take advantage of high price differentials between finished and unfinished cattle farmers have opted to

- Increase on-farm feed production and harvesting

and

- Adopted use of non-conventional feed resources and innovations in procurement of feed resources

The rise in on-farm fodder production and harvesting

Effects of drought during 2023-2024 has seen most beef farmers investing in:

- More on-farm production of cereal silage crops (maize, sugargraze sorghum, sudan grass) and improved grass pastures supported by new and diversifying seed vendors
- Harvesting of natural grass hay on-farm as well as along road-sides
- Development of thriving hay market including by non-livestock farmers
- **However, there remains shortage of seeds for perennial tree legumes on the seed market**

The rise in use of non-conventional feed resources

Also, due to drought as well as bid to reduce on-farm fattening there has been increase in use of non-conventional feed resources including:

- Poultry litter with some beef farmers entering arrangements with poultry farmers to provide hay for bedding and harvesting poultry litter in exchange
- Use of spent brewery waste for those close to breweries
- Off-take agreements to purchase Maputi waste, hammermilling offals and sunflower cake from small-scale toll oil expressers
- Due to periodic shortages of molasses, some beef farmers have coordinated to jointly import dried molasses from South Africa

Policy Developments Relevant to Beef Nutrition

IN CONCLUSION, LMAC and SMA continues to champion issues affecting the feed sector and the livestock protein sector including the following topical issues

- El Nino Drought Preparedness:
 - LMAC through Dr Reneth Mano is chairing the Livestock Drought Mitigation committee to ensure the country responds timeously to shortages in feed in the different regions of the country
 - LMAC is also involved in another subcommittee addressing expediting imports of key food and feed raw materials
- Zimbabwe Feed and Fodder Multi-Stakeholder Platform
 - Has been formed to craft strategies to promote climate resilient fodder production and marketing, and
 - To work with the Department of Livestock and Fisheries Development to develop feed and fodder strategy for the Ministry

I THANK YOU

Nutrition Profiles of Cereal Brans

Nutrient	Rice Bran	Maize Bran	Wheat Bran
Energy (kcal)	310-400	224	216
Crude Fat (g)	10-18 (5-9% SME)	0.92	4.25
Protein (g)	11.5-14.5(7-10.5 SME)	8.36	15.55
Carbohydrates (g)	40-50	85.64	64.51
Fiber (g)	14	85.5	42.8
Potassium (mg)	1485	44	1182
Phosphorus (mg)	1677	72	1013
Iron (mg)	18.54	2.79	10.57
Magnesium (mg)	781	64	611
Vitamin E (mg)	6.05	2.32	2.32

Nutritional Profiles of Protein Raws

Parameter	Cotton Meal (Dehulled, Solvent)	Sunflower Meal (Dehulled, Solvent)	Cotton Cake (Undehulled, Expeller)	Sunflower Cake (Undehulled, Expeller)
CP %	41–46	36–40	24–32	26–32
Fat %	1–2	1–2	6–12	8–12
Fibre %	10–14	12–16	22–28	18–24
Lysine (g/100g protein)	3.5–4.0	2.0–2.4	3.0–3.5	1.8–2.2
Arginine	11–12	6–7	10–11	5–6

ZHB BEEF SCHOOL 2026

Budgeting the way a cattleman thinks

A working cashflow model that starts with cattle numbers, not accounting codes

National Foods Stockfeeds





Most farm budgets are built for the bank

A BUDGET BUILT FOR THE BANK

Starts with accounting codes

Asks for last year's figures

Written once, filed, never opened

Tells you what happened

You cannot check it against the paddock

A BUDGET BUILT FOR THE FARMER

Starts with head of cattle

Asks what you plan to do this year

Updated whenever the herd changes

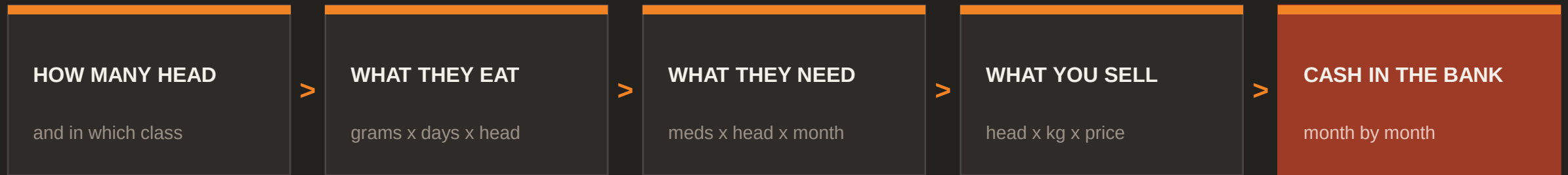
Tells you what is about to happen

Every line can be walked out and counted

The model we are looking at today does the second thing. Everything in it can be counted in a crush pen.



Everything flows from one number



Change the cattle numbers and every cost in the budget moves by itself. That is the whole design.

It also means the reverse: if your herd numbers are wrong, every other figure in the budget is wrong too. Count first.



You will build your own budget, on paper, today

1	Your herd, month by month	<i>Stock Numbers</i>
2	Your feed programme	<i>HERD FEED COSTS</i>
3	Your vet and medicine calendar	<i>VET & MED Costs</i>
4	Labour	<i>LABOUR</i>
5	Fixed and farm costs	<i>Budget by Code</i>
6	Your sales plan	<i>REVENUE ASSUMPTIONS</i>
7	Your cashflow	<i>Budget by Code</i>

**ONE
PAGE
PER
STEP**

Every page in your booklet matches one tab. Fill the page here, type it in at home - no guessing where things go.



Start with what is in the paddock

Opening numbers on 1 January, then only the months where something changes.

	OPENING	WHAT MOVES IT
Mature bulls	4	Culled, bought in
Breeding cows	100	Calving, deaths, culling
Weaner heifers	0	Weaning moves calves up
Weaner steers	0	Weaning moves calves up
Calves	75	Born, weaned, deaths
TOTAL	179 head	

REMEMBER

This worked example runs 179 head. Two assumptions do the heavy lifting: 85% calving and 0.25% deaths a month.

Fill in page 3 of your booklet now.

STEP 2



Feed is grams per head per day

The one number your feed rep already quotes you. The model does the rest.

	PRODUCT	GRAMS / HEAD / DAY
Summer months	Summer lick	100
Winter months	Winter lick	300 to 500
Weaners	Pen feeding meal	1 000 to 2 000
Dry season gap	Protein cubes	As advised
Roughage	Hay or hulls	By condition

REMEMBER

Grams x days in the month x head on hand x price per kg. That is the entire feed calculation.

Fill in page 4 of your booklet now.



Vet cost is your dosing calendar, priced

You already have this calendar in your head. We are only putting a price on it.

	HOW OFTEN	WHO GETS IT
Dipping	Every month	Whole herd
Anthrax / blackleg	Once a year	Whole herd
Brucellosis S19	Once	Heifer calves
Dosing / dewormer	Twice a year	Whole herd
Bull fertility test	Before breeding	Bulls only
Ear tags	At birth or weaning	Calves

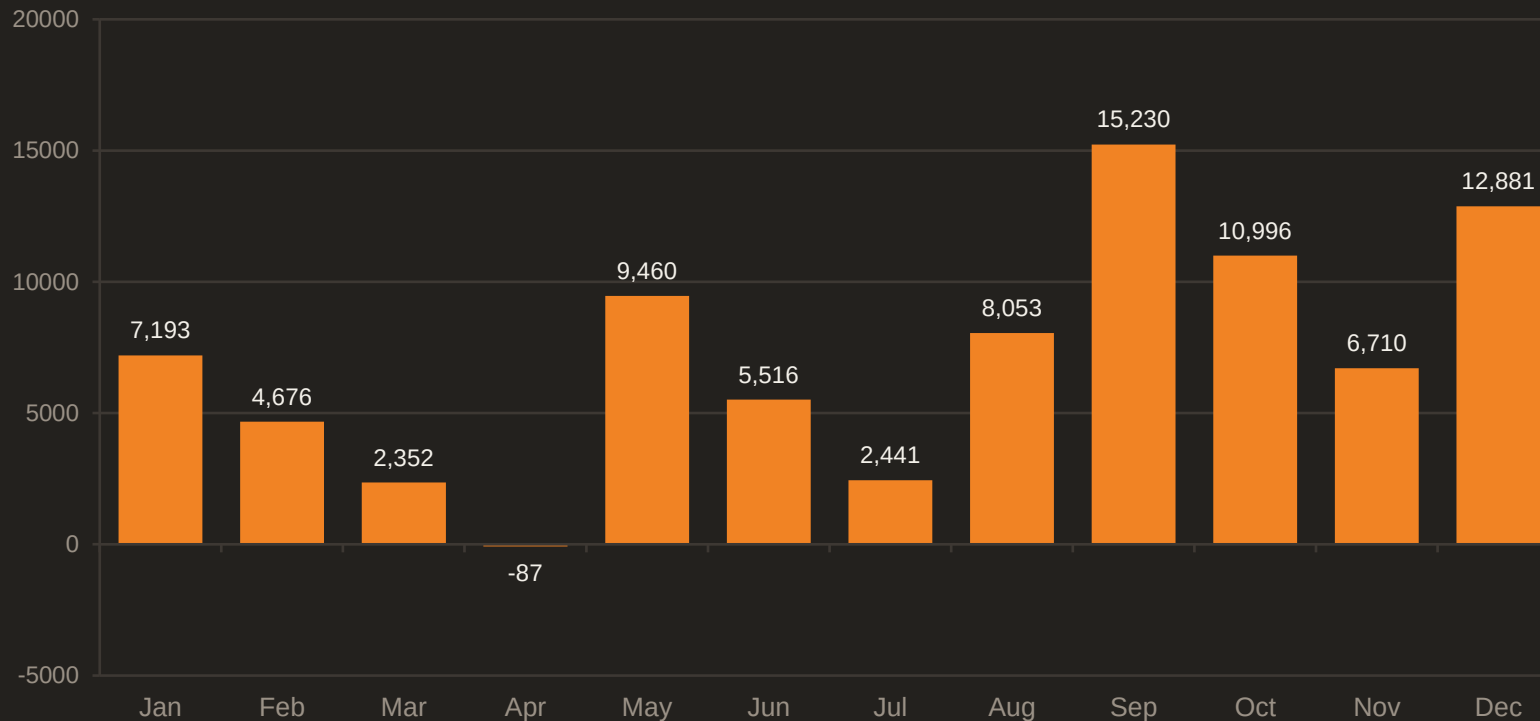
REMEMBER

Dipping and tagging are the two costs farmers most often leave out. In this example they are 15% of the vet bill.

Fill in page 5 of your booklet now.



This herd runs out of money in April



APRIL

-87

Cash goes negative before the first cattle cheque arrives in May.

Nothing on this farm is wrong.

The herd is fine, the feed is right, the sales are realistic. It is purely a timing problem - four months of costs before the first income.

Found in February, this is a phone call. Found in April, it is a distress sale.



Three decisions this changes

1

WHEN YOU SELL

You stop selling because you need cash this week, and start selling because the price and the weight are right. The budget shows you the tight month early enough to plan around it.

2

WHAT YOU FEED

Cost per head per day becomes visible. A lick that looks expensive per bag is often cheaper per kilogram of gain - and now you can prove it before you buy.

3

WHAT YOU CAN CARRY

Cost per livestock unit tells you whether the herd you are running is the herd the farm can actually afford to feed through the dry season.

A budget does not make you money. It buys you time to make a better decision - and time is the only thing you cannot buy back later.



Five mistakes that will make your budget lie to you

1 Selling on paper the month you load the truck

Enter the month the money reaches the bank. Thirty days changes which month goes red.

2 Budgeting the price you hope for

Use the price you would accept on a bad day. Better prices are a bonus, not a rescue plan.

3 Forgetting the once-a-year bills

Licences, dip levies, the December 13th cheque wage bonus. They are small until they all land in one month.

4 Leaving deaths out

Two to three percent a year is normal. A budget with no deaths overstates both your feed bill and your sales.

5 Filling it in once and filing it

Update it whenever the herd changes. A budget you do not revisit is a document, not a tool.



Type it in, in this order

1	Inputs	Prices first - feed per kg, vet per dose, labour per day
2	Stock Numbers	Opening herd, then births, deaths, sales, reclassifications
3	HERD FEED COSTS	Grams per head per day, in each month's block
4	VET & MED Costs	Number of treatments, in each month's block
5	LABOUR	How many workers, how many days
6	REVENUE ASSUMPTIONS	Head, weight and price - in the month you get paid
7	Budget by Code	Your fixed costs, then read the cash flow line

Only ever type into the shaded input cells. Everything else calculates itself.

You now have the hardest part done

The thinking is on paper. The typing is the easy bit.

Questions - and bring your booklet up if you want a hand with your own numbers





BEEF BUDGET CALENDAR

Build your cattle cashflow budget one page at a time

ZHB BEEF SCHOOL 2026

NATIONAL FOODS STOCKFEEDS

NAME

FARM / RANCH

BUDGET YEAR

HOW TO USE THIS BOOK

Fill in one page at a time as we work through the session. Every page matches one tab in the spreadsheet, so when you get home you copy straight across - no guessing where things go.

You do not need exact figures today. Your best estimate is enough. A budget built on rough numbers beats no budget at all.

The order matters. Cattle numbers come first, because everything else - feed, vet, labour, income - is driven by how many head you run and what class they are in.

The seven questions this budget answers

Tick each one off as we go

A cashflow budget is not accounting. It answers one question: will there be money in the bank each month, and if not, which month?

1	How many cattle will I have, month by month? Calving, deaths, weaning, sales and purchases all move the numbers.	Stock Numbers	☐
2	What will they eat, and what will that cost? Grams per head per day x days in month x head x price per kg.	HERD FEED COSTS	☐
3	What vet and medicine do they need, and when? Your dosing calendar, priced out.	VET & MED Costs	☐
4	What does my labour cost? Number of workers x days worked x daily rate.	LABOUR	☐
5	What are my fixed costs? Fuel, electricity, repairs, licences - the bills that come whatever you do.	Budget by Code	☐
6	What will I sell, when, and for how much? Head x weight x price per kg, in the month the money actually arrives.	REVENUE ASSUMPTIONS	☐
7	Which month do I run out of cash? The only number that matters on the day.	Budget by Code	☐



Work in this order. Skipping ahead means guessing.

Your herd, month by month

Head of cattle - not dollars

Start with what is standing in the paddock on 1 January. Then write in the months where numbers CHANGE. Leave the rest blank - we assume no change.

Use the calving % you expect, not the one you hope for. Be honest about deaths - 2 to 3% a year is normal. Weaners change class: show them moving.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Mature Bulls												
Breeding Cows												
Bulling Heifers												
Weaner Heifers												
Feeder Steers												
Weaner Steers												
Calves												

MARK THE MONTH FOR EACH EVENT

Calving starts / ends												
Weaning												
Culling round												
Bulls in / out												
Buying in												



Your feed programme

Write grams per head per day

For each class, write the product and how many grams per head per day, in the months you feed it. The spreadsheet turns this into tonnes and dollars.

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Mature Bulls	<i>g/hd/day</i>												
Breeding Cows	<i>g/hd/day</i>												
Bulling Heifers	<i>g/hd/day</i>												
Weaner Heifers	<i>g/hd/day</i>												
Feeder Steers	<i>g/hd/day</i>												
Weaner Steers	<i>g/hd/day</i>												
Calves	<i>g/hd/day</i>												
Hay / roughage	<i>g/hd/day</i>												

PRODUCTS AND PRICES

	Brand / product used	Pack size	Price per kg	Price per bag
Summer lick				
Winter lick				
Production lick / meal				
Protein cubes	Beef Budget Calendar ZHB Beef School 2026 National Foods Stockfeeds			

RULE OF THUMB

Summer lick and winter lick are rarely fed in the same month.

If a price changes mid-year, note the month - the model handles it.



Grams per head per day is the number your feed rep quotes. Use it as-is.

Your vet and medicine calendar

Tick the month, note which class

This is your dosing calendar. Mark the month each treatment happens and which classes get it. Cost per dose goes in the last column.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	\$/DOSE
Dipping / tick control													
General treatments													
Supavax (anthrax/blackleg)													
S19 Brucellosis													
Vibrio													
Lumpy skin													
Dosing / dewormer													
Multivitamin / mineral													
Bull fertility testing													
Ear tags													
Fluke treatment													
Other													

IN EACH CELL WRITE WHICH CLASSES ARE TREATED

B = bulls C = breeding cows BH = bulling heifers WH = weaner heifers S = steers CV = calves ALL = whole herd



Dipping is usually every month. Vaccinations are usually once or twice a year.

Labour and fixed costs

The bills that come whatever the cattle do

LABOUR

	How many	Days / month	Rate / day	Cost / month
Foreman				
Herdsmen				
Security				
Driver				
Tractor / general				
Casual				
Admin				
= TOTAL LABOUR				

Remember the December bonus month and any statutory contributions.

FIXED AND FARM COSTS

	Per month	Per year
Fuel and lubricants		
Electricity		
Repairs and maintenance		
Fencing and water		
Vehicle running		
Rates, licences, levies		
Insurance		
Transport - cattle		
Transport - feed		
Other		
= TOTAL FIXED		



Your sales plan

Head x weight x price - in the month you get paid

Write the month you expect the money to ARRIVE, not the month you load the truck. If the buyer pays 30 days later, move it a month.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Cull cows - head												
Cull cows - \$/kg												
Cull bulls - head												
Steers - head												
Steers - avg kg												
Steers - \$/kg												
Heifers - head												
Heifers - \$/kg												
Other income												

BE CONSERVATIVE HERE

A budget that assumes top price in every month is not a budget, it is a wish. Use the price you would accept on a bad day. If prices come in better, that is a bonus - not a hole to fill.



Your cashflow - the moment of truth

Fill this in last

Carry the totals across from the pages before. Closing cash for one month becomes opening cash for the next. Circle every month that goes below zero.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Opening cash												
+ Cattle sales												
+ Other income												
- Feed												
- Vet and medicine												
- Labour												
- Fixed and farm costs												
- Loan / interest												
= CLOSING CASH												

MY TIGHTEST MONTH IS: I AM SHORT BY:

WHAT I WILL DO ABOUT IT:



Putting your numbers into the spreadsheet

Twenty minutes, in this order

1

Open the Inputs tab first

Type your feed prices per kg, your vet costs per dose and your labour rates per day. This tab feeds everything else. Nothing else will be right until this is.

2

Go to Stock Numbers

Enter your opening herd on the top row. Then work down the months entering born, purchased, died, sold and reclassified. Only the months where something changes.

3

Go to HERD FEED COSTS, scroll to Monthly Feed Allocations

There is one block per month. Enter grams per head per day in the box for each class and product. Copy from Step 2 of this book.

4

Go to VET & MED Costs, scroll to Monthly Treatments

Same idea - one block per month. Enter the number of treatments for each class in the months you dose.

5

Go to LABOUR

Enter how many of each worker and the days worked in each month.

6

Go to REVENUE ASSUMPTIONS

Enter head, average weight and price per kg for each sale, in the month the money arrives.

7

Go to Budget by Code and type in your fixed costs

Fuel, electricity, repairs and the rest, straight into the month rows. Then look at the Cash Flow line.

Beef Budget Calendar | ZHB Beef School 2026 | National Foods Stockfeeds



Only ever type in the shaded input cells. Everything else calculates itself.



Fixed Time AI

A Farmer's Perspective

ANNE COOKE

FIXED TIME ARTIFICIAL INSEMINATION

WHY A.I AND WHY FIXED TIME

1. *Genetic diversity*
2. *Management*
3. *Convenience*
4. *Cost*

CONS

1. *Cow selection on natural cycling*
2. *Expense*
3. *Logistics*
4. *Technical know how*



VISIBLE GROUPING

Paint and readable IDs keep sires, groups and records aligned.

1 Plan

Book people, stock and space before the first handling.

2 Synchronise

Hold stable groups and execute every treatment on time.

3 Inseminate

Protect the semen, match the sire and record the event.

4 Confirm

Pregnancy-diagnose, track losses and learn from outcomes.

EXAMPLE OF A FTAI PROGRAM - 2026

FTAI - IRONWOODS 2026

BRAHMAN FIRST CALVERS - 9 ANIMALS

Day	DAY 17	DAY 10	DAY 3	DAY 2	DAY 1	DAY 0
Date	02/10	07/10	13/10	14/10	15/10	16/10
INJECT	07h00	07h00	07h00			07h00
A.I				08h00-09h00	07h00-08h00	
A.I			16h00-17h00	16h00-17h00	16h00-17h00	16h00
	PD & insert CIDR & inject 2ml Estrumate	Inject Cystorelin 2ml	Remove CIDR inject IM 2ml Estrumate & 2.5ml Chronogest	Standing heat contact vet A.I	Standing heat contact vet A.I	A.I am, inject Cystorelin no heat then A.I pm

TULI HEIFERS - 16 ANIMALS

Day	DAY 1	DAY 8	DAY 9	DAY 10	(37 days)
Date	05/10	12/10	13/10	14/10	20/10
Group 1	7h00	7h00	7h00	13h00	11h00
Hours			24	30	
Track 54hrs				54	
	PD & insert CIDR & inject 2ml Estradiol Benzoate	Remove CIDR & inject 2ml Cidar/ estrumate	24hrs after removal of CIDR inject 1ml estradiol benzoate	FTAI - 54 hours after removal of CIDR	PD by Scan 37 days post FTAI

49 days
12/2/2026

TULI COWS

Day	DAY 0	DAY 8	DAY 9	DAY 10	(49 days)
Date	11/11	18/11	19/11	20/11	08/01
PD Scan				11h00	8h00
Group 1	7h00	7h00	7h00	13h00	
Group 2	9h00	9h00	9h00	15h00	
Hours			24	30	
Track 54hrs				54	
	PD & insert Cue-mates & inject 2ml Estradiol Benzoate	Remove Cue-mate & inject 2ml Cidar/ estrumate	24hrs after removal of Cue-mates inject 1ml estradiol benzoate	FTAI - 54 hours after removal of Cue-mate. PD scan earlier FTAI	PD by Scan 49 days post FTAI

REMINDERS FOR PROGRAM

<u>REMINDERS FOR PROGRAM</u>				
<u>AUGUST</u>				<u>SEPTEMBER - CHECK LIST</u>
1	Vaccinate for BVD and IBR (Dead vaccine heprobovis 4)			1 Check semen in stock identify sires by colour & group for AI
1	BCS 2.5 minimum			2 Check FTAI program on new CIDRs/Cuemates
15	Book Vets			3 Vitamin injection all A.I cows
15	Order Stock			4 BCS - 2.5 to 3
	Check Expiry dates			5 Check Semen quality
				6 A.I List - match paint to sires
<u>S.A</u>	<u>LOCAL</u>	<u>ON SITE</u>		7 Check ordered stock has arrived
Vitamins	Needles	Tent		8 A.I equipment - confirm with inseminator
BVD & IBR	Syringes	Table		9 Familiarise cattle with raceway - can use cubes
CIDR	Sharps box	Table cloth		
Cystorelin	Plastic tweezers	Paper weights		<u>OCTOBER</u>
Estrumate	Artery forceps	Chairs	1	1st October weigh & BCS/BCS and ID with paint
Applicator	Plastic gloves	Flask	14	Tables, chairs, waterproof gazebo, lunches (vet & staff)
Acroflavin	Paper towels	Water	15	Vitamin injection all A.I cows (Complex+A&E or Multivitamin +A&E)
Estroject stickers	Paint	Lunches	15	BCS - 3 to 3.5
Sheaths	Paint Stick	Straw bags		
Needles		Dandas		<u>NOVEMBER</u>
Syringes			1	1st November BCS cows and ID with paint
			14	Tables, chairs, waterproof gazebo, lunches (vet & staff)
			20	BCS - 3 to 3.5

NOTES

1	Homework - why each cow should go to a particular bull	16	Sort straws into program prior to the FTAI day
2	Have a goal and follow up	17	Different colour straws in the same cannister
3	Check for any PDs at first insertion of Cuemates	18	Mark cannisters for each A.I group
4	No stress or procedures on cows until from Oct to Jan	19	Understand how the flask cannisters work - practice
5	If cue-mate comes out in week replace it	20	Have more straws than you need
6	Group the cows by sires so easier at A.I time	21	Have a system in place for who will be doing what job
7	Mark cattle with paint by group for ease on the day	22	Tags or brands must be clearly visible and easy to read
8	Need to be precise with timings	23	Keep things in order so its easy to find
9	Organise sufficient stockmen for the FTAI	24	Have already printed or written up A.I sheets (spare pens)
10	Tuli must be 45 days (5/10) post calving	25	Shelter over the table for sun or rain
11	Brahman 60 days (21/9) post calving	26	Be early and keep to time
12	Groups must be stable to avoid hierachy stress	27	Have a good inseminator
13	Check flask three weeks before hand	28	A.I equipment - who has what
14	Check straws of new semen	29	Make a good day of it
15	Good maintenance of cold chain		

Every station needs clear job description



01 CATTLE FLOW

Stable groups • visible tags/brands • calm movement through race

02 SEMEN

Marked canisters • sire colours matched • extra straws • cold chain intact

03 INSEMINATION

Equipment checked • experienced inseminator • time and notes recorded

04 COORDINATION

Enough stockmen • printed sheets • shelter • arrive early and keep time

One system owner keeps the groups, semen, inseminator and records on the same clock.



Cold chain protects every straw



01 • KNOW THE FLASK

Practice how each canister works.

Check the flask three weeks before use; keep canisters clearly marked.



02 • SORT BEFOREHAND

Match colour to sire and group.

Do not cluster identical straw colours together; carry more straws than planned.



03 • THAW ON THE CLOCK

Move deliberately, not slowly.

Keep the straw protected, heat as prescribed and hand off directly to the inseminator.

Equipment & Materials

SEMEN	50	1 per straw	PAINT	5	
VACCINATIONS	50	1 per dose	PAINT BRUSH	5	
VITAMINS	50	1 per dose			
CIDR	50	1 per CIDR	INSEMINATOR		Vet/Tec
NEEDLES	50	5 per syringe	PREGNANCY TEST		Vet/Tec
SYRINGES	50	5 per needle			
ESTROTECT	50	per sticker	FLASK	1	
			APPLICATOR	1	
HORMONES			ACROFLAVIN	1	
Regime One		MLS	D10 SOL. ANTISEPTIC	1	
Estradiol Benzoate	50	3 per animal	SHARPS BOX	1	
Estrumate	50	2 per animal	TABLE	2	
Regime Two		MLS	TABLE CLOTH	2	
Estrumate	50	4 per animal	CHAIRS	3	
Cystorelin	50	4 per animal	TENT	1	
hronogest (PMSG)	50	2.5 per animal	LUNCHES	5	

Hidden Costs

- TIME INVESTED COMPARED TO PRODUCTIVITY ELSEWHERE
- DELAYED PDS AND POTENTIAL EMPTY COWS
- SUCCESS RATE/COST
- NUMBERS TO SPREAD OVERHEAD COST
- COST OF TRAINED STAFF OR TRAINING OF STAFF
- RECORD KEEPING
- FEED COSTS TO GET CATTLE IN BCS 3+ AT THE RIGHT TIME
- KEEPING CATTLE SEPARATE
- ROUNDED AMOUNTS OF DOSES AND MEDICATION ETC
- TRAVEL COSTS DEPENDING ON DISTANCE
- BAD GENETICS PUT INTO HERD AT A HIGH RATE

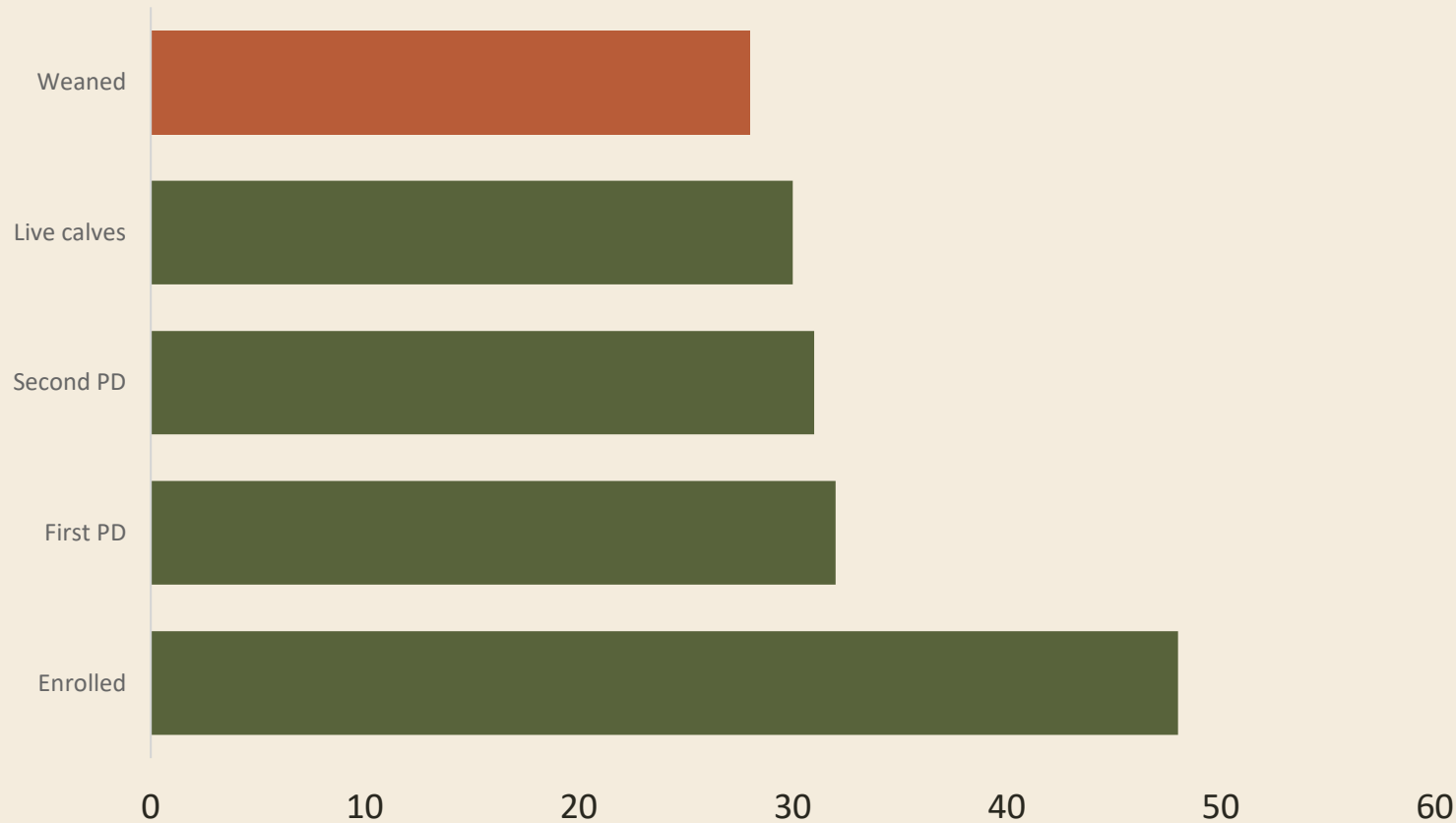
STATS

24-25

Source: FTAI presentation.xlsx
Sheet: STATS 24-25

[illegible]

From 48 females, 28 were weaned



OF ALL ENROLLED FEMALES

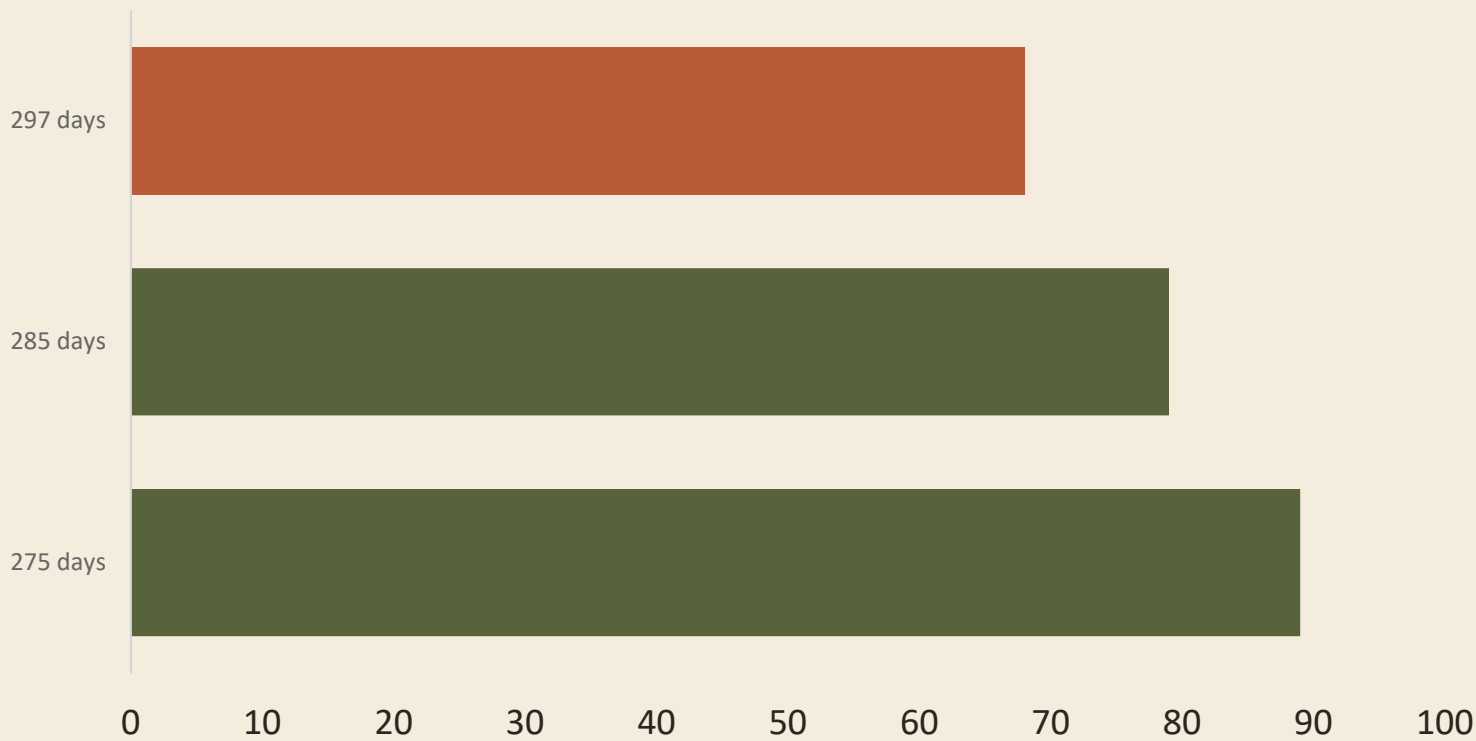
58%
were successfully
pregnant, calved and
weaned

93% of live calves were
weaned
28 of 30

*This funnel separates conception
from the full farm outcome: a live,
weaned calf.*

Long gestation compresses recovery time

Days between calving and the next planned FTAI



ESTIMATED 21-DAY CYCLES

4.2 275 days

3.8 285 days

3.2 297 days

Farm planning minimum
Tuli 45 days • Brahman 60 days

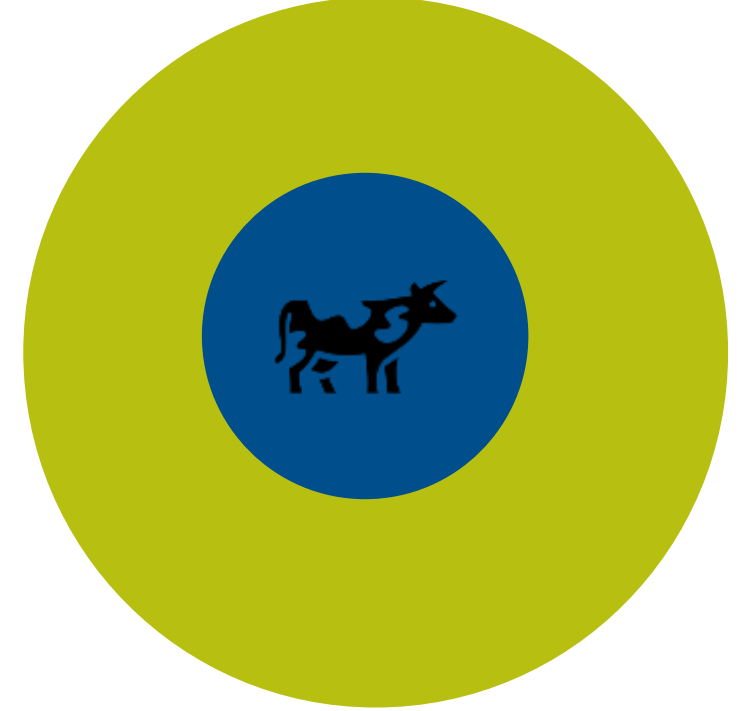
Longer gestation compresses recovery time before the next breeding window.

BEEF SCHOOL 2026

Home Mixing of Feed: Taking Control of the Ration

Cutting cost, improving consistency, and building confidence at the mixer wagon
— for producers in South Africa and Zimbabwe

Chris Cilliers – Trouw Nutrition



AGENDA

What We'll Cover Today



01 Why Home Mix?

The case for mixing your own ration



03 Nutrition Fundamentals

Balancing rations that actually perform



05 Sourcing & Quality

Ingredients, consistency, mycotoxin risk



07 Regulatory & Safety

SA and Zimbabwe feed law basics



02 The Economics

Real feedlot cost examples and break-even math



04 Equipment & Infrastructure

Mixers, storage, and calibration



06 Practical Mixing & Records

Getting the batch right every time



08 Mistakes, Case Studies & Q&A

What to avoid, real regional numbers, discussion

Feed Is the Cost You Can Actually Control

South Africa's roughly 100 commercial feedlots finish an estimated 70–80% of the country's beef, with capacity for about 650,000 animals at a time. In that kind of system, feed efficiency is what separates a profitable operation from a loss-making one — and it's the input a producer can most directly manage.



Cost Savings

- Cut out commercial concentrate markup
- Buy commodities at bulk/spot prices
- Redirect savings to herd growth



Control

- Know exactly what's in the trough
- Adjust formulation on your terms
- No surprise ingredient swaps



Flexibility

- React fast to maize and by-product price swings
- Change rations by stage or season
- Use what's available on-farm

Source: Scholtz et al., SASAS, 2025 (full reference on final Sources slide).

Put Regional Ingredients to Work



What's Available Regionally

- Maize — the dominant feed grain in both SA and Zimbabwe rations
- Sunflower oilcake — the region's 4th largest protein meal source after soybean, cottonseed, and canola meal
- Molasses meal — commonly included in cattle rations to boost palatability and energy
- Citrus pulp and brewers' by-products — used where available near processing plants. Although important to keep in mind that the quality of this varies a lot.

A published Chinhoyi feedlot case study fed 200 head on a concentrate-to-snapped-maize ratio of roughly 1:9 — maize was the backbone of the ration, supplemented with a smaller concentrate portion.

Know your local ingredient map before you design a ration.

Sources: Grain SA; Molatek; Kukodza Ltd feedlot case (Chinhoyi, Zimbabwe) — full references on final Sources slides.



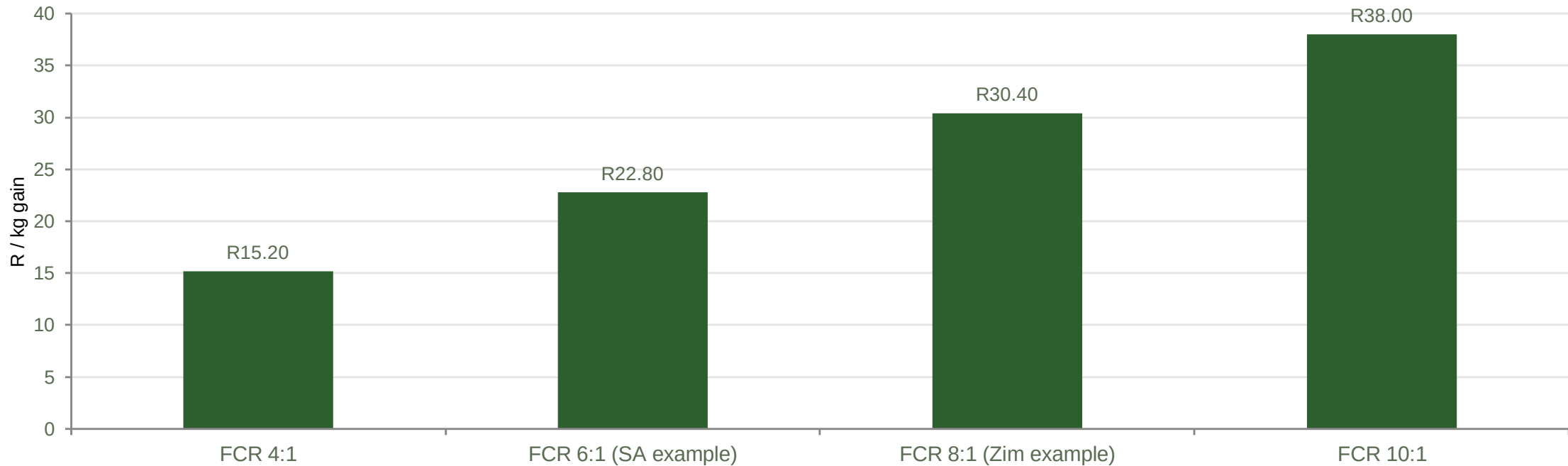
The Economics

Real regional feedlot numbers before anyone commits a mixer wagon to the yard

Feed Conversion Ratio Is What Drives Your Cost

A 2022 Grain SA worked example: a 230 kg weaner grown to 460 kg on a feedlot ration (73% maize, 12% roughage, 15% concentrate) consumed 1,380 kg of feed over 150 days — a feed conversion ratio (FCR) of about 6:1. At a feed cost of R3.80/kg, that's roughly R22.80 of feed per kg of live-weight gain.

Illustrative Feed Cost per kg Gain by FCR (at R3.80/kg feed)



Sources: Grain SA (SA example, FCR 6:1); Kukodza Ltd feedlot case, Zimbabwe (FCR 8:1). Other bars are the same formula extrapolated — use your own feed price. Full references on final Sources slides.

When Does Home Mixing Pay Off?



Break-Even Drivers

- Herd size — fixed equipment cost spreads over more head
- Days on feed — longer finishing periods amplify savings
- Maize and by-product price spread vs. commercial concentrate premium
- Labor availability — is mixing time already "free" capacity?
- Equipment already owned vs. new capital purchase

Regional Scale

650,000

head is the estimated total capacity of South Africa's commercial feedlot sector at any one time

Smaller herds can still benefit from home mixing using simple auger or paddle mixers with lower capital outlay than a full TMR wagon.

Source: Scholtz et al., SASAS, 2025.

Don't Forget the Hidden Costs



Labor & Time

Mixing, loading, and cleanup all take real hours — value your own time honestly



Equipment Depreciation

Mixer wagons, augers, and grinders wear out and need repair budgets



Wastage & Spoilage

Spillage, moldy storage, and over-mixing losses erode the savings



Opportunity Cost

Time spent mixing is time not spent on other farm priorities



Nutrition Fundamentals

Home mixing only pays off if the ration is actually balanced

Match the Ration to the Production Stage

Stage	Energy Need	Protein Need	Key Focus
Growing cattle	Moderate	High	Frame growth, skeletal development
Backgrounding	Moderate-High	Moderate	Steady gain, rumen conditioning
Finishing	High	Moderate	Energy density, marbling, feed efficiency
Cow-calf (maintenance)	Low-Moderate	Low-Moderate	Body condition, reproduction
Lactating cows	High	High	Milk yield, calf growth support

Source: NASEM, *Nutrient Requirements of Beef Cattle*, 8th Ed., 2016 — the standard reference framework for beef cattle nutrient requirements.

It's Not Just "Filling the Trough"



Energy

Grains, silage quality, and fat sources drive rate of gain



Protein

Balance rumen-degradable and bypass protein for the stage of growth



Fiber

Effective fiber keeps rumen function healthy and prevents acidosis



Minerals & Vitamins

Trace minerals and vitamins are easy to under-supply in home mixes

Source: NASEM, *Nutrient Requirements of Beef Cattle*, 8th Ed., 2016.

Test Before You Formulate



Why Testing Matters

- Nutrient content varies field to field, cutting to cutting, load to load
- Guessing forage quality is a leading cause of underperforming rations
- A lab test costs far less than a season of poor gains
- Retest silage and hay as new cuttings or pits are opened

90%

of farms tested by the Arkansas Beef Improvement Program showed high variability (CV > 10%) in hay protein content between cuttings

Test, don't assume — a formulation is only as good as the numbers behind it.

Source: Ag Proud, citing Arkansas Beef Improvement Program data. Same principle applies locally — use an accredited SA/Zim feed lab.

Get Help Balancing the Ration



Ration Balancing Software

- Least-cost formulation tools match nutrient targets to your actual ingredient prices



A Nutritionist or Vet

- A short consult can catch mineral or protein gaps before they cost you gain



Review Regularly

- Re-balance as ingredient prices and forage test results change through the year

Source: *Farmer's Weekly*, "What to consider when mixing your own feed" — recommends working with a livestock nutritionist or veterinarian to formulate and periodically review a custom feed plan.



Equipment & Infrastructure

The right kit for your herd size — no more, no less

Choosing the Right Mixer for Your Scale

Mixer Type	Best For	Trade-off
Auger / paddle mixer	Small herds, simple rations	Lower capital, limited batch size
Stationary mixer	Mid-size operations, fixed feeding site	Good consistency, less mobility
Mixer wagon (TMR)	Larger herds, varied ration groups	Highest cost, best mixing accuracy



Trailed mixer-wagons range from about 5 m³ to more than 45 m³, with displacement depending on ration dry matter — match capacity to today’s herd, not an aspirational future one.

Source: "Mixer-wagon," Wikipedia (equipment capacity reference).

Processing and Storing Ingredients Correctly



Grinding & Processing

- Grain particle size affects both digestibility and acidosis risk
- Roller mills vs. hammer mills — match to grain type and volume
- Regular maintenance keeps particle size consistent batch to batch



Storage

- Dedicated bins or silos for each major ingredient
- Moisture control is critical — wet storage invites spoilage and mould
- First-in-first-out rotation to avoid ingredients aging in storage

Accuracy Starts With Scales

~1%

is the accuracy a properly calibrated TMR mixer scale system can typically maintain

- Calibrate load cells on a schedule — not just when something looks wrong
- Zero the mixer before every batch to catch drift early
- Simple test: weigh 1 kg bags on a kitchen/bench scale, add them one at a time, and compare against the mixer readout to check sensitivity
- Basic maintenance — greasing bearings, checking gearboxes, inspecting knives — protects scale and mix accuracy alike

Sources: KUHN, "TMR Mixers"; American Cattlemen / Digi-Star, "TMR Corner — Evaluating TMR mixer performance."



Ingredient Sourcing & Quality Control

Cheap ingredients only save money if they're consistent and safe

Sourcing By-Products Safely and Consistently



Oilcake

- Oilcake with hulls is lower in protein and energy than dehulled oilcake — know which you're buying. This can affect the outcome of your ration drastically.



Molasses Meal

- Commonly included in cattle rations, and in dairy and calf rations, to lift palatability and energy. This is not the only source of energy cattle need.



Plan Delivery & Storage

- Confirm you can store and use the volume before spoilage sets in

Sources: Grain SA, "Use of sunflower oilcake in dairy cattle rations"; Molatek, Molasses Meal product guide.

Vitamins and Minerals:



Micro-minerals

- Vitamins – Vit A, E, D, B
- Zn
- Mn
- Cu
- Co
- I



Macro-minerals

- MCP
- Urea
- Limestone
- Salt



Mineral sources

- Not all mineral sources are created equal. The source of your minerals has a big influence:
- Organic ?
- Sulfate?
- Hydroxy ?

Mycotoxin Risk Is a Real Regional Issue

Aflatoxin exposure estimates compiled from Southern African data show the scale of the problem — and why maize storage discipline matters here more than in many other regions.

0–17

South Africa: estimated aflatoxin exposure, ng/kg
body weight/day

18–43

Zimbabwe: estimated aflatoxin exposure, ng/kg
body weight/day

0–1

Western Europe / North America, for comparison

- Wet grain or silage stored without adequate compaction or sealing raises risk
- Test suspect loads before feeding, and discard visibly spoiled material — don't dilute and feed

Source: "Mycotoxin contamination of foods in Southern Africa: A 10-year review (2007–2016)," *Critical Reviews in Food Science and Nutrition* (Taylor & Francis), citing Liu & Wu (2010) aflatoxin exposure estimates.

Consistency Is the Real Product

Variability between batches — not any single bad ingredient — is the most common home-mix pitfall. Cattle perform best on a predictable ration.



Test periodically, not just once — ingredient nutrient content drifts over a season



Recalibrate and re-verify mixer accuracy on a fixed schedule



Keep a written formulation sheet so every batch is mixed the same way



Track performance data to catch drift in gain or intake early

Source: Farmer's Weekly, "What to consider when mixing your own feed" — recommends keeping detailed records of formulation, ingredient sources, and quantities.



Practical Mixing Considerations

The day-to-day habits that make or break ration quality

Batch Size, Mixing Order, and Time



Right-Size the Batch

- Match batch size to herd/group size to avoid over- or under-mixing
- Too small a batch relative to mixer capacity gives poor blend accuracy
- Too large risks spillage and uneven distribution



Order & Duration

- Add ingredients in the sequence your mixer manufacturer recommends
- Under-mixing leaves poor nutrient distribution; over-mixing can grind forage too fine and cause separation
- Time each batch consistently — don't eyeball it

Source: American Cattlemen / Digi-Star, "TMR Corner — Evaluating TMR mixer performance: the scale system."

Moisture Management and Record-Keeping



Moisture Management

- Silage moisture swings change the actual as-fed ration weight
- Adjust inclusion rates as silage dry matter changes through the pit or bunker
- Check moisture regularly, especially after weather events



Record-Keeping

- Log every formulation, batch weight, and mixing time
- Track ingredient test results alongside the rations that used them
- Good records turn a problem batch into a quick diagnosis, not a mystery

Source: Farmer's Weekly, "What to consider when mixing your own feed."



Regulatory & Safety

What SA and Zimbabwe law actually require before you mix

What the Law Requires in SA and Zimbabwe



South Africa

- Animal feed is regulated under the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947)
- Manufacturing, importing, or selling farm feed requires registration; a sample must go to an accredited lab for analysis
- Registrations are valid for 3 years and must be renewed
- The Act also governs use of antimicrobials for growth promotion/prophylaxis and over-the-counter antimicrobial purchase by farmers



Zimbabwe

- Governed by the Fertilizers, Farm Feeds and Remedies Act, with the Farm Feeds Regulations, 2014 (S.I. 162 of 2014) setting registration rules
- A stockfeed intended for commercial-level feeding should be registered — even if it's for home consumption — at the Registrar's discretion
- Medicated feed constituents must be registered, with active ingredients declared and levels kept within Medicines Control Authority of Zimbabwe limits

Sources: AFMA, "Act 36" resource page; gov.za, "Register farm feeds and pet food"; SAHPRA, Act 36 of 1947 document page; FAO Ecolex, Farm Feeds Regulations 2014 (S.I. 162/2014); SWM Programme, "Zimbabwe – Statutory law – Animal production." Confirm current requirements with your regulator or vet — this is a summary, not legal advice.



Mistakes, Real Case Studies & Discussion

What to avoid, real regional numbers, and your questions

Pitfalls That Erase the Savings



Formulating on ingredient cost alone and ignoring nutrient balance



Not adjusting the ration as forage quality changes through the season



Poor mixer maintenance leading to inconsistent batches



Underestimating the labor and time commitment of mixing daily



Skipping ingredient testing to save a small lab fee



Storing maize and by-products without moisture or mould control

Key Takeaways



Feed is the cost you can most directly control — home mixing gives you a real lever to pull



Balance the ration against NASEM (2016) reference values — don't just fill the trough



Right-size your equipment to your herd, and calibrate scales to within about 1%



Consistency and record-keeping matter as much as the recipe itself



Know the Act 36 (SA) or Farm Feeds Regulations (Zimbabwe) basics before adding any medicated ingredient



Thank You

Questions, discussion.

Home Mixing of Feed | Beef Cattle Conference



LABOUR MOTIVATION

BUILD YOUR BEST TEAM

AJS KIRK

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Maslow's Hierarchy of Needs

Self-Actualization

Reaching full potential, expressing creativity and personal growth



Esteem

Self-respect, recognition, status and personal achievement



Social needs

Friendships, relationships, and a sense of belonging



Safety

Security & stability, including financial, physical and job safety

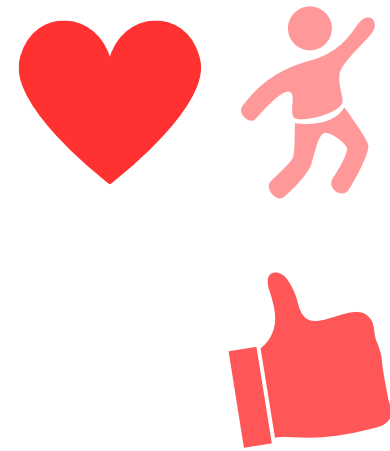


Physiological Needs

Basic survival needs - food, water, shelter, health



Share the dream and the load



Share the dream, the big picture

- Why are we here?
- What is in it for all of us?



Share the load

- Have a clear structure, with individual ownership of each area
- Respect the structure - don't override it

Look after your people

Compensate adequately - it will pay off

- People will only focus at work if their, and their family's, basic needs are being met
- By getting the best out of people, you can afford to pay them more
- Be the employer of first choice, not last resort

Empower with knowledge and skills

- Train & motivate everyone to be the best at what they do

Encourage and value



Ask for, and value, employees' ideas

- Your brain would fill a yoghurt container - the brains of everyone on your farm could fill a 200l drum
- It takes time to convince people their input is wanted and valuable
- If you use your employees' ideas as much as possible, they will start thinking while they work, and add valuable ideas to the pool

Share goals



Set goals and get buy-in from your employees

- Agree on clear goals with your management and supervisors
- Set up SOPs for your staff and clear bonus structures for following SOPs and reaching targets
- Rewards only come for achievements
- Try to be soft on people, but tough on standards

NEC Agriculture

Herdsman	A2	\$91
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Fencing Attendant	A1	\$86
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Guard	A2	\$91
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Working Hours

ALL may work 8.5 hours a day or 208 hours per month

**AS THE BOSS YOU
HAVE TO
EARN RESPECT
AND BUILD TRUST;**

demanding it does not work.

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