



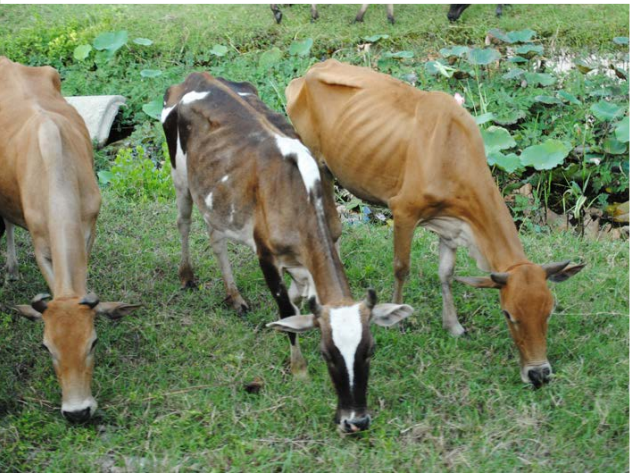

Application of updated Animal Equivalent (AE) approach

Col Paton, Ian McLean & Stu McLennan

EcoRich GRAZING

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MEAT & LIVESTOCK AUSTRALIA

final report

Project code: B.GBP.0036

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Re-defining the animal unit equivalence (AE) for grazing ruminants and its application for determining forage intake, with particular relevance to the northern Australian grazing industries

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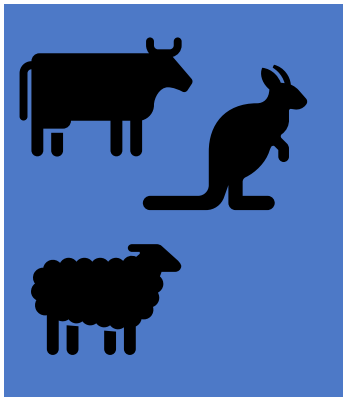
AE Report to MLA; Stu McLennan, Ian McLean and Col Paton

- The report contains:
  - Literature review of AEs
  - Explanation of modified Australian feeding standards equations to suit tropical pastures
  - Definitions - AE, how to calculate, etc.
  - Explanation of Intake Constants & how derived
  - Application of AE Approach

Presentation overview

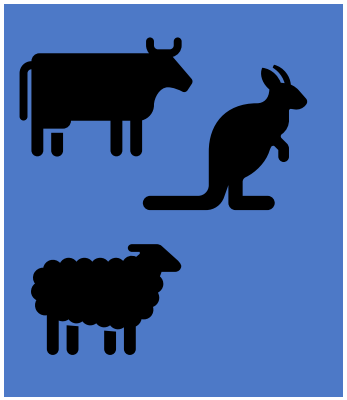
1. Adult Equivalent (AE) system
2. Issues with past approach
3. Improved AE approach
4. Levels of application
5. Updating EDGE material

AE system



A way of **comparing** animals of different weights, classes and species, for many purposes including **predicting feed consumption**.

AE system is used for:



- Describing the grazing pressure imposed on pastures by foraging animals
- Forage budgeting and paddock carrying capacity assessments
- Economic comparisons across enterprises, properties and businesses
- Property valuations

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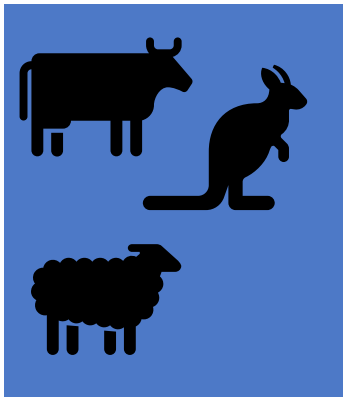
AE system



Consequences of **underestimating** feed consumption for different classes of animals:

- Overgrazed paddocks
- Poor reproduction rates
- Animals not meeting performance targets
- Poor business performance; higher carrying capacity expectations than can be sustained

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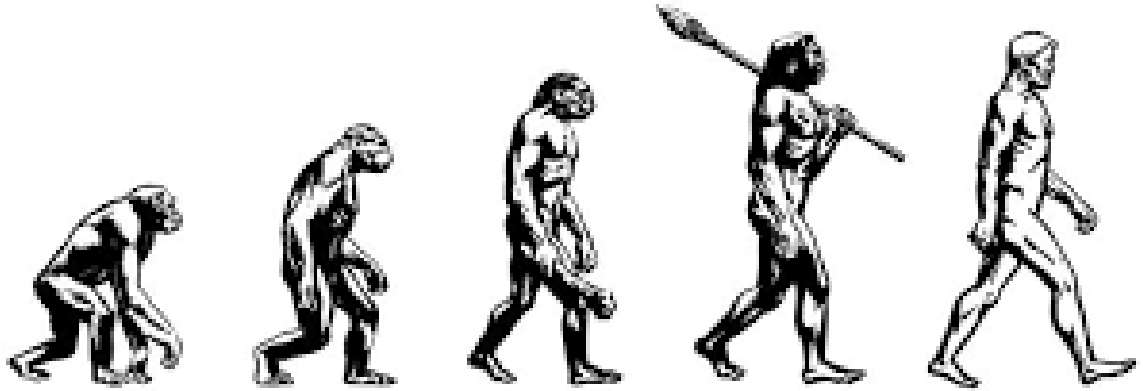
The evolution of the AE



Liveweight → Metabolic weight → ME Requirements

Another step…

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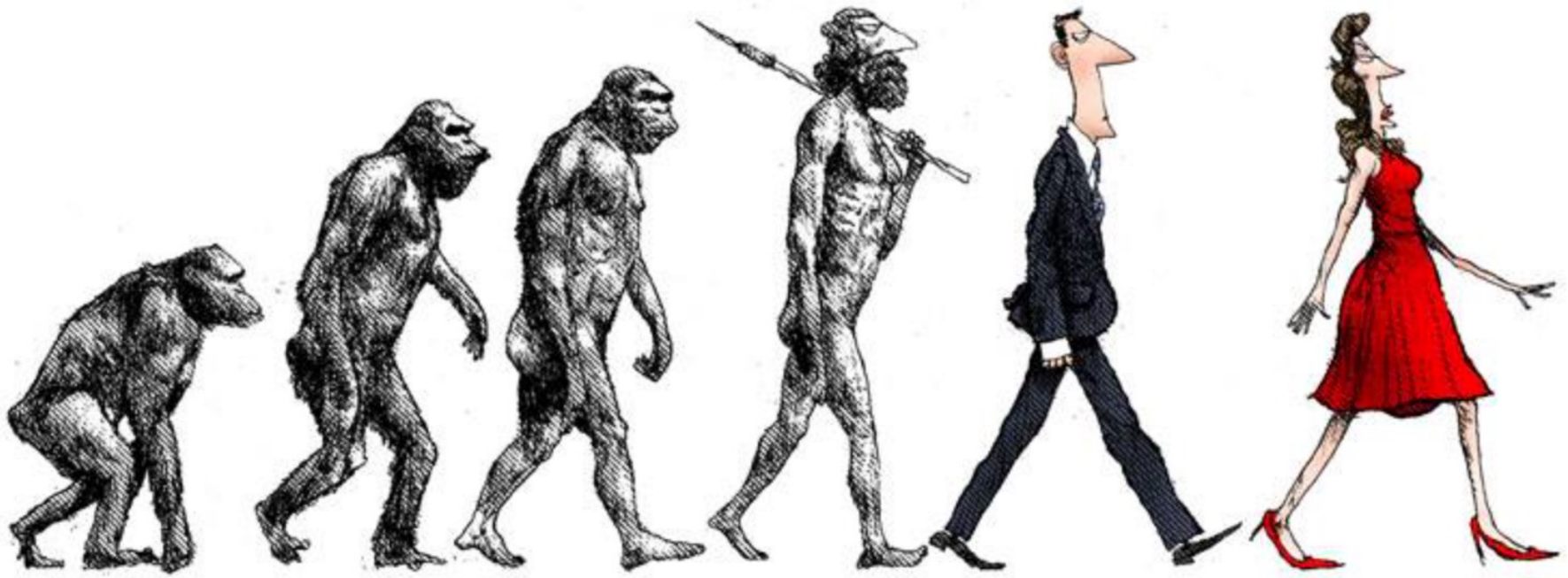

The EVOLUTION of MAN.

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www.investors.com/cartoons

Evolution of the AE system

	Previous approach	New approach
AE	450kg	450kg
Rating Formula	$\frac{\text{(Liveweight of animal in question)}^{0.75}}{\text{Liveweight of AE (450 kg)}^{0.75}}$	$\frac{\text{ME requirement of animal in question}}{\text{ME requirement of AE}}$
Intake constant	10kg DM/AE/day	8kg DM/AE/day (7.5, 8.5)
Animal intake	AE rating x intake constant	AE rating x intake constant

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Issues with previous approach for forage budgets & LTCCs

1. **10 kg DM/AE/day** intake

   An overestimate at maintenance – 2.2% of liveweight, weight gain would be expected, but safe

2. Intake of animal = AE rating x Intake constant….**overestimates** at low growth rates & **underestimates** at high growth rates

3. Did not cater for **walking**

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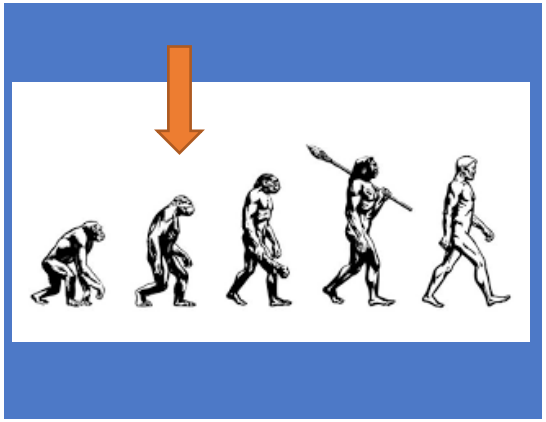
Issues with previous approach for forage budgets & LTCCs

5. Australian feeding standards **underpredict weight gain** of cattle fed tropical forages

6. Approach uses average weight and does not cater for growth.

	Weight change	Weight gain	Average weight	Previous AE rating	New AE rating
Steer	350 to 450kg	**100kg**	400kg	0.92	1.05
Steer	300 to 500kg	**200kg**	400kg	0.92	1.44

Tropical Pastures Feeding Experiments



McLennan (published **2013**) did research on intakes of cattle grazing tropical pastures and found:

- **18% overestimation** of intakes at same digestibilities & weight gains using Australian Feeding Standards (NRDR 2007) equations

- Also **Activity** accounts for 15-20% of total energy demand by animals grazing on pasture

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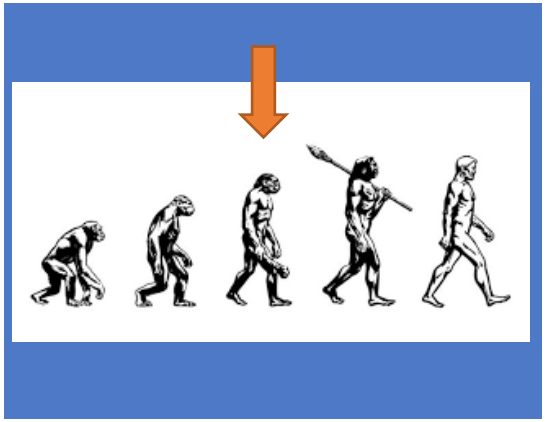
AE tables based on relative ME need



2014 McLean & Blakely developed Relative Adult Equivalent tables that:

- Used **relative ME requirements** from the Australian feeding standards (NRDR 2007)
- Catered for growth and walking
- 9.4 kg DM/day default intake
- **BUT** 9.4 kg was an overestimate of intake and didn't work well in forage budgets

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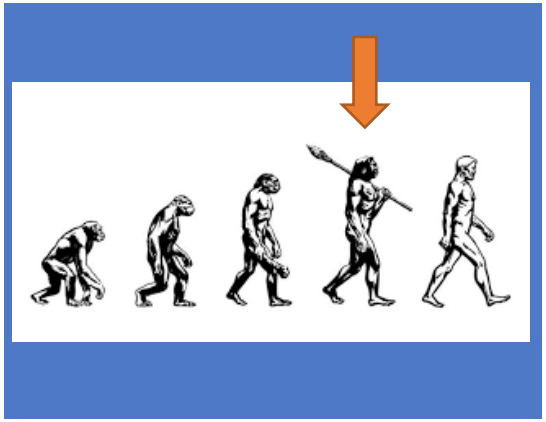
Production data review



2020 McLennan et al. report

- McLennan **Adjusted Australian Feeding Standards equations** – to account for intakes on tropical pastures

- McLean used data from Bray et al. (2015) to compare:
  - intakes from modified equations developed by McLennan with
  - Intakes calculated by multiplying AE ratings from McLean & Blakeley x Intake constant eg 8 kg ⇒ fitted very well (R^2 0.95)

Teamwork!

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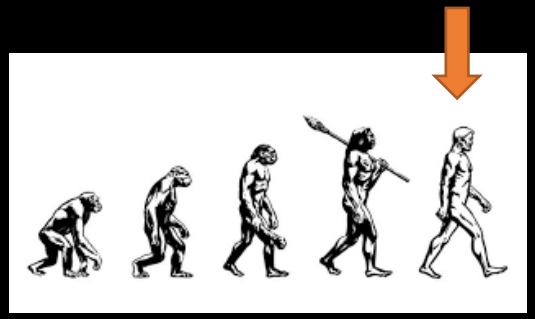
NEW!

AE Approach



Caters **growth, reproduction and activity** to better reflect relative energy demands under grazing situations

Gives a more accurate intake for cattle on **tropical** pastures

Allows for **consistent calculation** and expression of animal units for different uses and species

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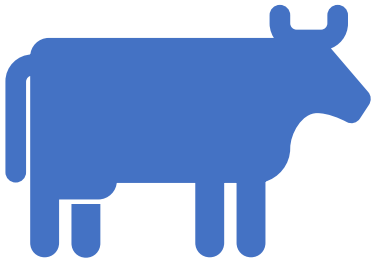
Definition of AE

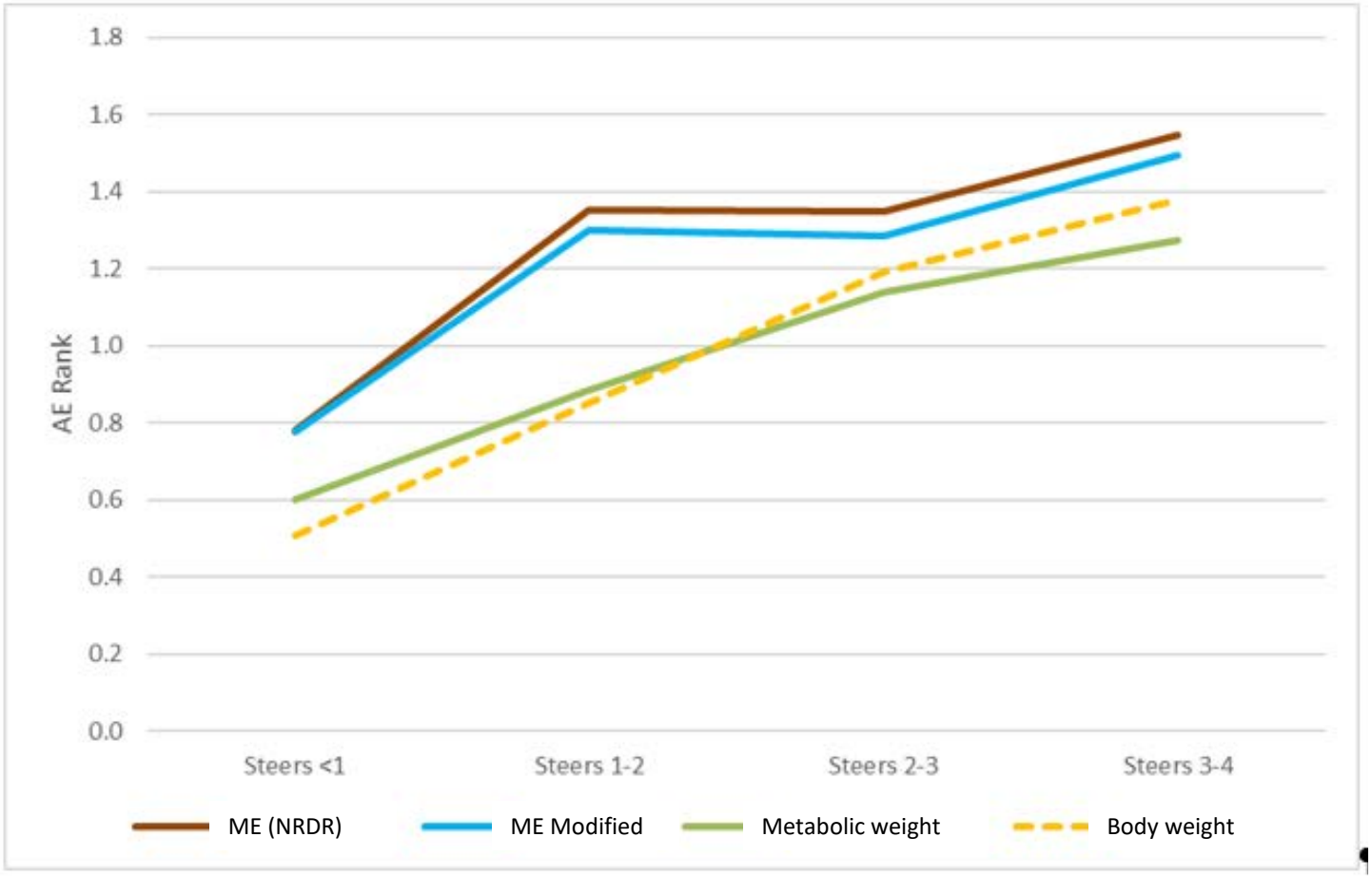
- Energy (ME) requirements of different classes of stock **relative** to the ME requirement of a **standard animal**

- The **standard animal** is:
  - 2.25 YO 450 kg Bos taurus steer with zero weight gain
  - walking 7 km/day and
  - Using the Australian feeding standards (NRDR 2007) the standard animal requires 73 MJ of ME /day

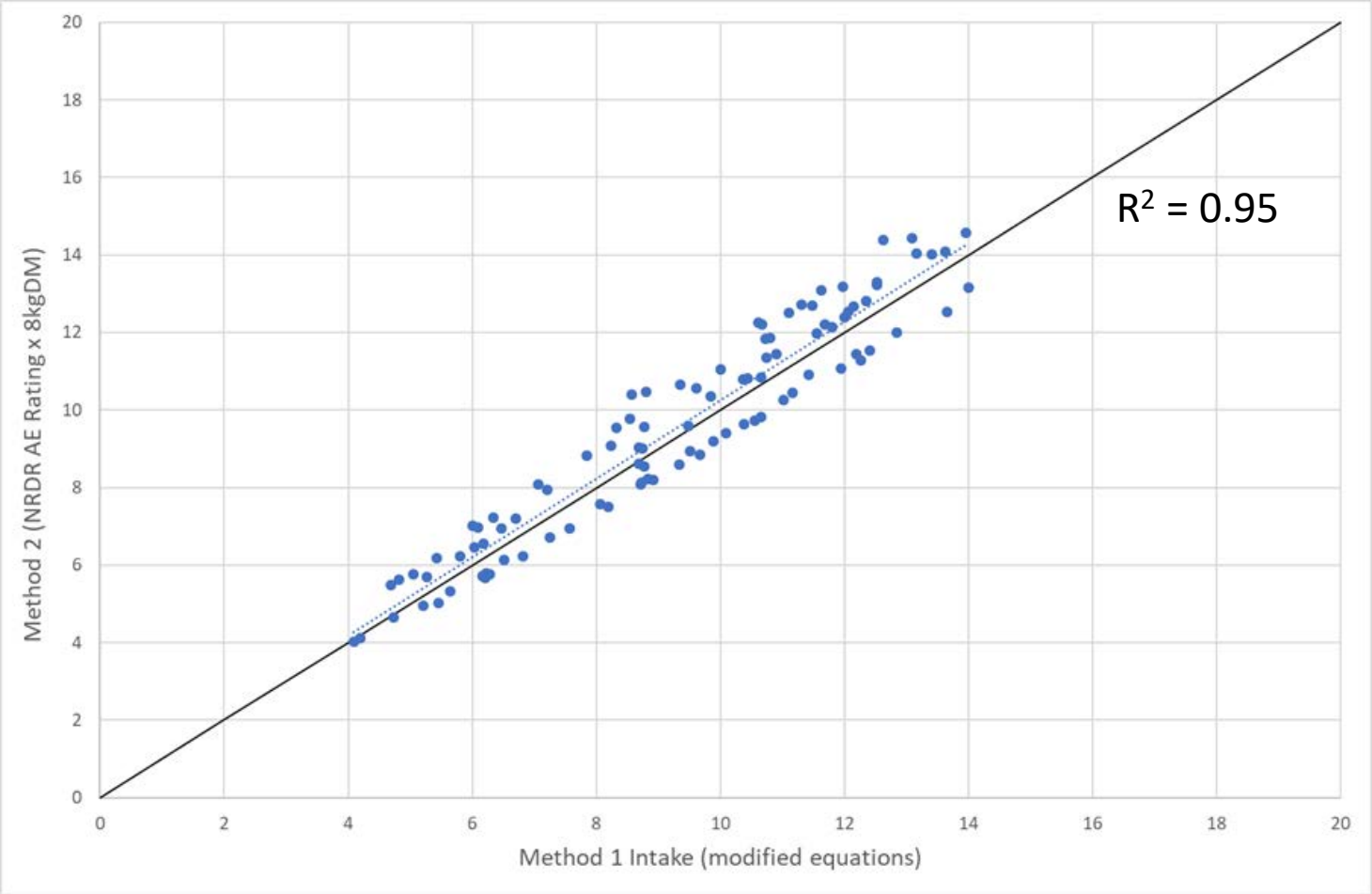


- AE rating = $\frac{\text{ME requirement of animal in question}}{\text{ME requirement of standard animal}}$

Changes with age in AE rating for steers in the high production regions of Queensland calculated using different methods



Comparing intakes from 8 kg x AE rating with QuikIntake (Bray et al. seasonal data)



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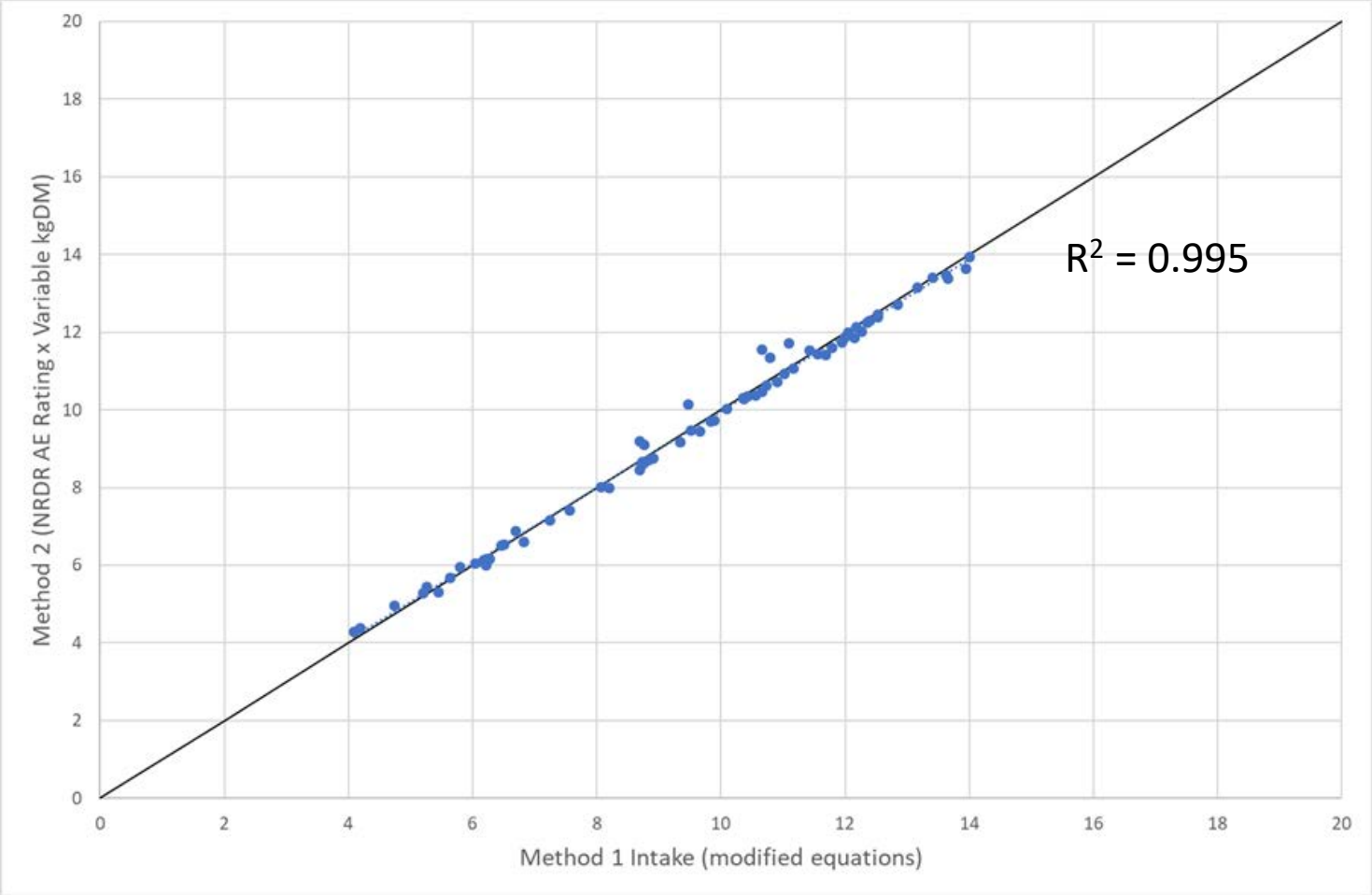
Varying between 7.5 & 8.5 kg/d according to regional productivity….



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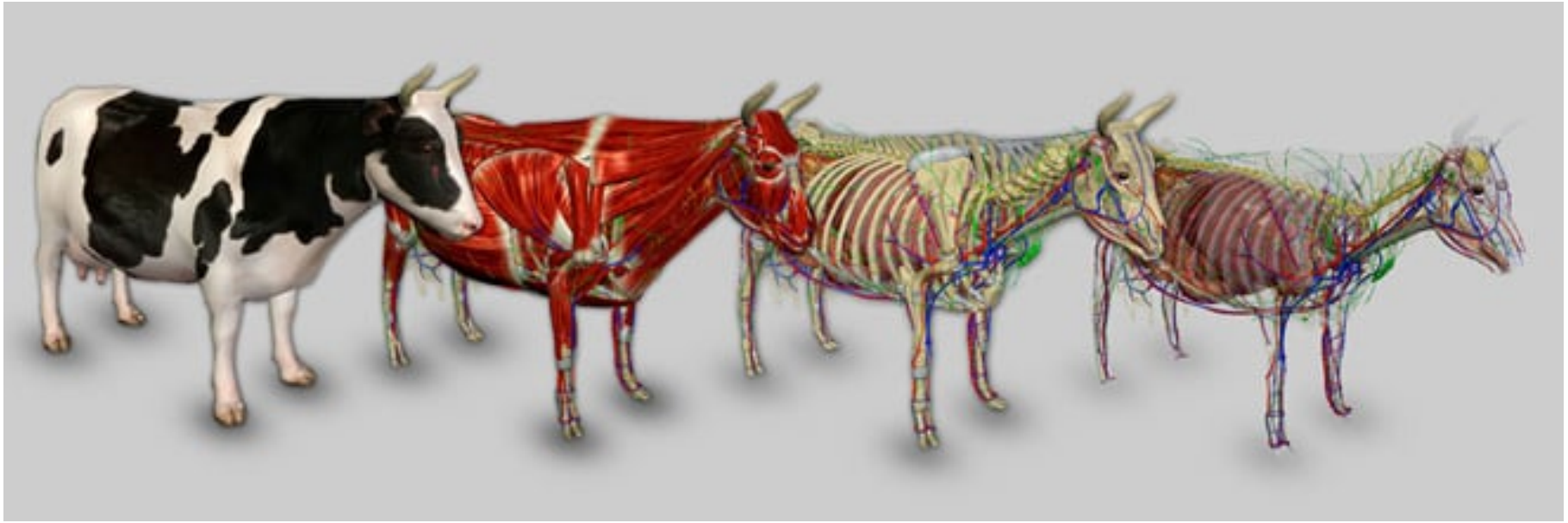
As simple or complex as you want it to be



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New AE Approach – 3 Levels

Level	Best for:	Reference tool
1 SIMPLE	• LTCC using AE rating x Intake constant (8kg/day) • Basic forage budgets > 4mths	Generic tables (broad production zones, figures based on regional averages)
2 INTERMEDIATE	• LTCC use more detailed AE tables • More accurate forage budgets > 4 months	Bush Agri tables (cattle of different weights, classes and breeds)
3 ADVANCED	• Short duration forage budgets < 4 months with weight gains > 0.6 kg/day (e.g. oats) • Very specific production targets	Multi-variate models (e.g. 'QuikIntake' and Bush Agri 'Herd Tool' https://www.bushagri.com.au/ae/)

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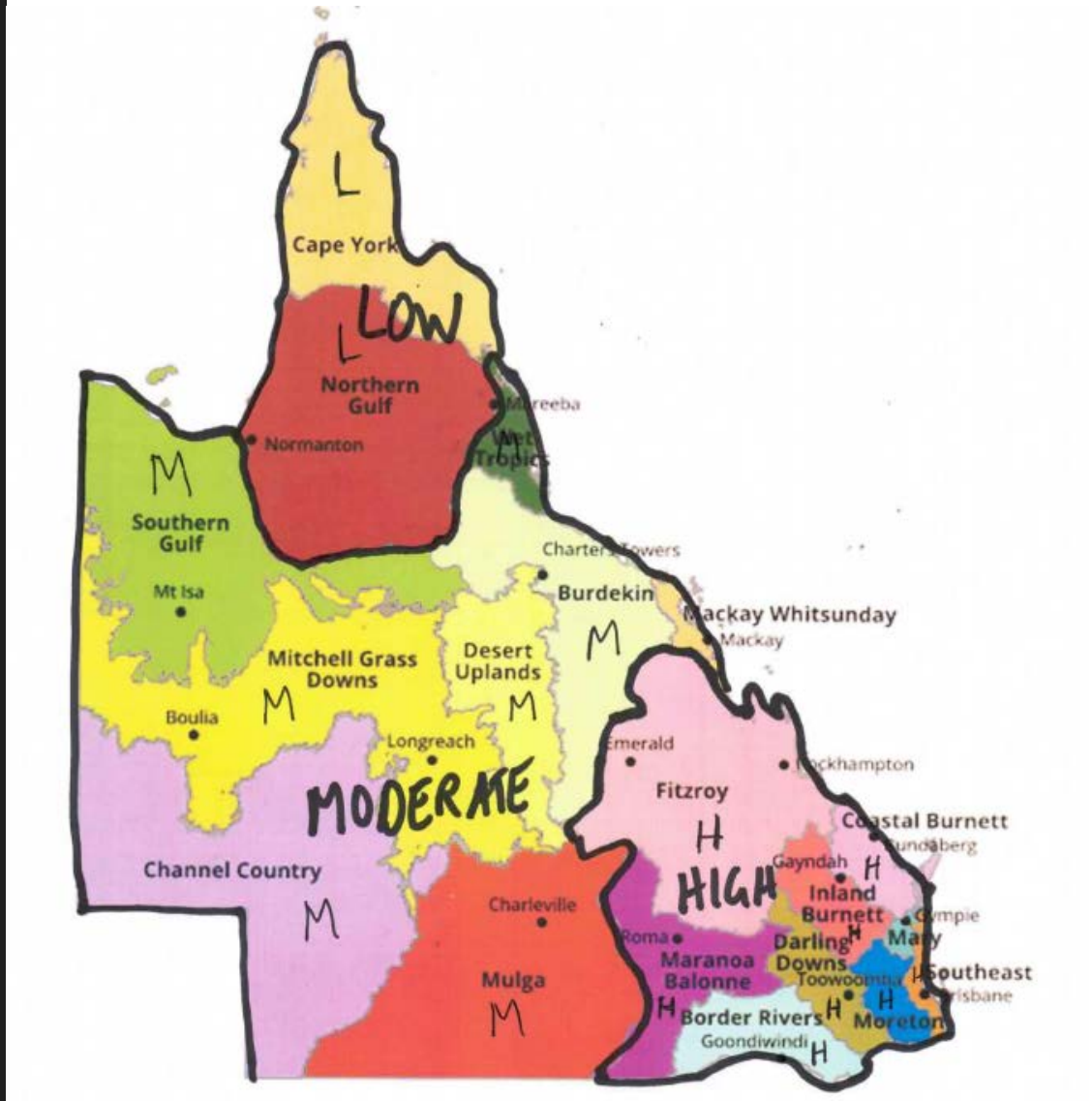
Rich GRAZING

Level 1 - Simple

Class of Animal	Generic Animal Equivalent Ratings~		
	High (>150kg/yr)	**Moderate** (110-150kg/yr)	**Low** (<110kg/yr)
Females <1	0.77	0.68	0.57
Females 1-2*	1.1	0.91	0.72
Females 2-3*	1.74	1.12	0.96
Females 3-4*	1.61	1.49	1.18
Females 4+*	1.53	1.28	1.08
Steers <1	0.8	0.72	0.6
Steers 1-2	1.31	1.03	0.78
Steers 2-3	1.6	1.27	1.02
Steers 3-4	1.52	1.39	1.15
Bulls	1.55	1.52	1.29
Intake per AE Kg DM/day	**7.5**	**8**	**8.5**

~ Accounts for major genotypes by production region

Production zones in Queensland



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Level 2 - Intermediate

CROSSBRED CATTLE AE TABLES

Animal Equivalent (AE) Ratings represent energy demand relative to the standard AE animal (450kg Bos taurus steer with zero liveweight gain)

Growing Animals (any period)
Steers and Dry Empty Females

Average Liveweight	Average Daily Gain (kg/hd/day)					
	0	0.2	0.4	0.6	0.8	1.0
150	0.43	0.53	0.64	0.75	0.86	0.98
200	0.49	0.61	0.74	0.86	1.00	1.13
250	0.59	0.73	0.87	1.02	1.17	1.32
300	0.68	0.84	1.00	1.17	1.34	1.51
350	0.76	0.95	1.13	1.31	1.50	1.69
400	0.85	1.05	1.24	1.44	1.64	1.84
450	0.94	1.14	1.35	1.56	1.76	1.97
500	1.01	1.23	1.44	1.66	1.87	2.09
550	1.09	1.31	1.53	1.75	1.96	2.18
600	1.17	1.39	1.61	1.83	2.05	2.27
650	1.24	1.46	1.68	1.90	2.13	2.35
for bulls add	11%	7%	5%	3%	1%	0%

Breeding Females (annualised mob average)
Includes calf to weaning, assumes 12mth calving interval and zero LWG

Average Liveweight	Weaning %						
	60%	65%	70%	75%	80%	85%	90%
350	1.11	1.14	1.17	1.20	1.23	1.26	1.29
375	1.16	1.19	1.22	1.25	1.28	1.31	1.34
400	1.20	1.23	1.26	1.29	1.32	1.35	1.38
425	1.25	1.28	1.31	1.34	1.37	1.40	1.43
450	1.29	1.32	1.35	1.38	1.41	1.44	1.47
475	1.34	1.37	1.40	1.43	1.46	1.49	1.52
500	1.38	1.41	1.44	1.47	1.50	1.54	1.57
525	1.43	1.46	1.49	1.52	1.55	1.58	1.61
550	1.47	1.51	1.54	1.57	1.60	1.63	1.66
575	1.52	1.55	1.58	1.61	1.64	1.67	1.70
600	1.57	1.60	1.63	1.66	1.69	1.72	1.75

Breeding Females (monthly individual average)
Includes calf to weaning, assumes 12mth calving interval and zero LWG

Average Liveweight	Months from birth												Annual Average
	-5	-4	-3	-2	-1	+1	+2	+3	+4	+5	+6	+7	
350	0.77	0.80	0.86	0.97	1.17	1.78	1.85	1.86	1.84	1.79	1.72	0.75	**1.34**
375	0.82	0.85	0.91	1.02	1.22	1.82	1.89	1.91	1.89	1.84	1.76	0.79	**1.38**
400	0.86	0.89	0.95	1.06	1.26	1.87	1.94	1.95	1.93	1.88	1.81	0.84	**1.43**
425	0.91	0.94	1.00	1.11	1.31	1.91	1.98	2.00	1.98	1.93	1.85	0.89	**1.47**
450	0.95	0.99	1.05	1.16	1.35	1.96	2.03	2.04	2.02	1.97	1.90	0.93	**1.52**
475	1.00	1.03	1.09	1.20	1.40	2.00	2.08	2.09	2.07	2.02	1.94	0.98	**1.57**
500	1.04	1.08	1.14	1.25	1.44	2.05	2.12	2.13	2.11	2.06	1.99	1.02	**1.61**
525	1.09	1.12	1.18	1.29	1.49	2.09	2.17	2.18	2.16	2.11	2.03	1.07	**1.66**
550	1.13	1.17	1.23	1.34	1.54	2.14	2.21	2.22	2.20	2.15	2.08	1.11	**1.70**
575	1.18	1.21	1.27	1.38	1.58	2.19	2.26	2.27	2.25	2.20	2.13	1.16	**1.75**
600	1.23	1.26	1.32	1.43	1.63	2.23	2.31	2.32	2.30	2.25	2.17	1.21	**1.80**
	2nd trimester		3rd trimester						1st trimester			2nd trim	
						Lactating							

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Level 3 - Advanced

Productivity Region **High** *(Annual steer growth >150kg LW)*

2

Variables	Baseline Data	User Input	Applied
Genotype	Crossbred	Crossbred	Crossbred
Age of first joining (mths)	15	27	27
Maiden Heifer Conception Rate	90%	95%	95%
First Calf Heifer Conception Rate	75%	75%	75%
Mature Breeder Conception Rate	83%	85%	85%
Birth Weight (male & female)	35	30	30
Weaning Age (mths)	6	7	7
Animal Liveweights by sex and age			
Females @Birth	35		30
Females @weaning	201	200	200
Females @12mths	258	240	240
Females @24mths	384	370	370
Females @36mths	471	400	400
Females @48mths	509	450	450
Females @60mths	509		450
Males @Birth	35		30
Steers @weaning	219	210	210
Steers @12mths	279	250	250
Steers @24mths	475	380	380
Steers @36mths	570		570
Steers @48mths	666		666
Bulls @Birth	35		30
Bulls @Weaning	220		220
Bulls @12mths	289		289
Bulls @24mths	501		501
Bulls @36mths	612		612
Bulls @48mths	719	800	800

HERD SUMMARY

Description		Weights		Reproduction		AE Rating per head
Sex and Age	Class	Start Weight	End Weight	Pregnant	Lactating	
Females <1	Weaner Heifers	200	240			0.71
Females 1-2	Replacement Hefier	240	370	0%		1.00
Females 2-3	Maiden Heifers	370	400	94%	0%	0.97
Females 3-4	First Calf Heifers	400	450	74%	91%	1.61
Females 4+	Mature Breeders	450	450	84%	78%	1.40
Steers <1	Weaner Steers	210	250			0.69
Steers 1-2	Young Steers	250	380			0.99
Steers 2-3	Grown Steers	380	570			1.52
Steers 3+	Bullocks	570	666			1.52
Bulls <1	Weaner Bulls	220	289			0.90
Bulls 1-2	Young Bulls	289	501			1.44
Bulls 2-3	Grown Bulls	501	612			1.57
Bulls 3-4	Grown Bulls	612	800			2.10
Bulls 4+	Grown Bulls	800	800			1.69
						#DIV/0!

README | Herd Data | Female Growth Path | Steer Growth Path | AE Ratings | Female AE | Steer ...

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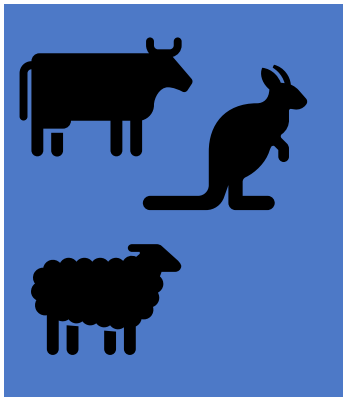
A National System

- Aust feeding standards AE rating x Intake constant (e.g. 8 kg/AE/d)
- Allows national comparisons
- Caters for sheep and goats
- Roos (Lester Pahl data)

Updating EDGE materials



- Description and definition of AE
- Simple AE tables to drop into text of all packages, where required

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Primary source - Level 1 simple AE tables

Class of Animal	Generic Animal Equivalent Ratings~		
Cattle	High (>150kg/yr)	Moderate (110-150kg/yr)	Low (<110kg/yr)
Females <1	0.77	0.68	0.57
Females 1-2*	1.1	0.91	0.72
Females 2-3*	1.74	1.12	0.96
Females 3-4*	1.61	1.49	1.18
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Steers 3-4	1.52	1.39	1.15
Bulls	1.55	1.52	1.29
Intake per AE Kg DM/day	**7.5**	**8**	**8.5**

Class of Animal	Generic Animal Equivalent Ratings		
Sheep	Dorpers	Merinos	
		Sml-Med	Med-Lge
Ewe			
Wether			
Hogget			
Lamb			
Goats	Large	Small	
Nanny			
Billy			
Kid			
Horses	1.5	0.9	
Donkeys			
Camels			
Roos	0.066 (25kg Avg weight)		

~ Accounts for major genotypes by production region

Where 1 DSE is a 45 kg wether with no weight gain and the ratio of AE:DSE is 1:8.4

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Appendices – Level 2 AE tables

CROSSBRED CATTLE AE TABLES

Animal Equivalent (AE) Ratings represent energy demand relative to the standard AE animal (450kg Bos taurus steer with zero liveweight gain)

Growing Animals (any period)
Steers and Dry Empty Females

Average Liveweight	Average Daily Gain (kg/hd/day)					
	0	0.2	0.4	0.6	0.8	1.0
150	0.43	0.53	0.64	0.75	0.86	0.98
200	0.49	0.61	0.74	0.86	1.00	1.13
250	0.59	0.73	0.87	1.02	1.17	1.32
300	0.68	0.84	1.00	1.17	1.34	1.51
350	0.76	0.95	1.13	1.31	1.50	1.69
400	0.85	1.05	1.24	1.44	1.64	1.84
450	0.94	1.14	1.35	1.56	1.76	1.97
500	1.01	1.23	1.44	1.66	1.87	2.09
550	1.09	1.31	1.53	1.75	1.96	2.18
600	1.17	1.39	1.61	1.83	2.05	2.27
650	1.24	1.46	1.68	1.90	2.13	2.35
for bulls add	11%	7%	5%	3%	1%	0%

Breeding Females (annualised mob average)
Includes calf to weaning, assumes 12mth calving interval and zero LWG

Average Liveweight	Weaning %						
	60%	65%	70%	75%	80%	85%	90%
350	1.11	1.14	1.17	1.20	1.23	1.26	1.29
375	1.16	1.19	1.22	1.25	1.28	1.31	1.34
400	1.20	1.23	1.26	1.29	1.32	1.35	1.38
425	1.25	1.28	1.31	1.34	1.37	1.40	1.43
450	1.29	1.32	1.35	1.38	1.41	1.44	1.47
475	1.34	1.37	1.40	1.43	1.46	1.49	1.52
500	1.38	1.41	1.44	1.47	1.50	1.54	1.57
525	1.43	1.46	1.49	1.52	1.55	1.58	1.61
550	1.47	1.51	1.54	1.57	1.60	1.63	1.66
575	1.52	1.55	1.58	1.61	1.64	1.67	1.70
600	1.57	1.60	1.63	1.66	1.69	1.72	1.75

Breeding Females (monthly individual average)
Includes calf to weaning, assumes 12mth calving interval and zero LWG

Average Liveweight	Months from birth												Annual Average
	-5	-4	-3	-2	-1	+1	+2	+3	+4	+5	+6	+7	
350	0.77	0.80	0.86	0.97	1.17	1.78	1.85	1.86	1.84	1.79	1.72	0.75	**1.34**
375	0.82	0.85	0.91	1.02	1.22	1.82	1.89	1.91	1.89	1.84	1.76	0.79	**1.38**
400	0.86	0.89	0.95	1.06	1.26	1.87	1.94	1.95	1.93	1.88	1.81	0.84	**1.43**
425	0.91	0.94	1.00	1.11	1.31	1.91	1.98	2.00	1.98	1.93	1.85	0.89	**1.47**
450	0.95	0.99	1.05	1.16	1.35	1.96	2.03	2.04	2.02	1.97	1.90	0.93	**1.52**
475	1.00	1.03	1.09	1.20	1.40	2.00	2.08	2.09	2.07	2.02	1.94	0.98	**1.57**
500	1.04	1.08	1.14	1.25	1.44	2.05	2.12	2.13	2.11	2.06	1.99	1.02	**1.61**
525	1.09	1.12	1.18	1.29	1.49	2.09	2.17	2.18	2.16	2.11	2.03	1.07	**1.66**
550	1.13	1.17	1.23	1.34	1.54	2.14	2.21	2.22	2.20	2.15	2.08	1.11	**1.70**
575	1.18	1.21	1.27	1.38	1.58	2.19	2.26	2.27	2.25	2.20	2.13	1.16	**1.75**
600	1.23	1.26	1.32	1.43	1.63	2.23	2.31	2.32	2.30	2.25	2.17	1.21	**1.80**
	2nd trimester		3rd trimester						1st trimester			2nd trim	
						Lactating							

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EcoRich GRAZING

Other updated tables in EDGE

- Metabolisable Energy requirements tables
- Protein requirements tables
- Forage budgets
- Annual intakes for LTCCs

Forage budget

New

Forage Budget with Unpalatable 3Ps Component

		Select Production Zone (H, M or L)	Moderate
			Example
A		Paddock Area (ha)	1,500
B		Start Date	01-May-17
C		End Date	01-Jan-18
D	= C - B	Number of Days	245
		Pasture	
E		Start Yield	2,000
F		Detachment (%)	15%
G	= E x F / 100		300
H		Unpalatable species (%)	20%
I	= (E - G) x H / 100		340
J		Unpalatable 3Ps component (%)	10%
K	= (E - G) x J		170
L		Anticipated growth (kg/ha)	100
M	= E - G - I + L	Useful Pasture (kg/ha)	1,460
N		Desired residual (kg/ha)	1,000
O	= M - (N or K)	Available for grazing (kg/ha)	460

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Forage budget

		Demand	
		Class of Cattle	Steers 1-2
P		Total Number of head	600
Q		Entry weight	280
R		Exit weight	350
S		Average weight	315.0
T	Look up AE Tables	AE Rating per animal	1.03
		Daily weight gain (kg)	0.29
U	= P x T	Adult Equivalents	618
V		Dry Matter Intakes (kg/AE/day)	8
W	= V x U x D / A	Demand (kg/ha)	808

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Previously

		FEED DEMAND	
		Class of cattle	Steers
P		Total number of head	70
Q		Entry weight	340
R		Exit weight	360
S	= Q + R / 2	Average weight	350
T	Look up AE table	AE rating (add 0.3 for wet cows)	0.83
U	= P x T	**Adult Equivalents**	**58.1**
		Dry matter intake (% per AE)	1.8%
V	% DMI / 100 x 450	Dry matter intake (kg/AE/day)	8.1
W	= V x U x D / A	**Demand (kg/ha)**	**809kg/ha**

No need to estimate intake % anymore!

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Forage budget

	Results	
= (O x A) / (V x U)	How many days will pasture last with current stock numbers?	140
= (O x A) / (V x D)	How many AE's will paddock carry to end date?	352
= W / M x 100	Pasture eaten as % of Useful Pasture	55
= M - W	Residual Useful Pasture (kg/ha)	652

Annual intakes for LTCCs..

8 kg/day

Land Type and Paddock Carrying Capacity Calculator - ample water points

FD usually 2,920 kg/AE/year

Paddock	Land Type	Land Condition (ABCD)	Tree basal area (m^2/ha)	Pasture Growth (kg DM/ha/year)	Utilisation rate (%)	Pasture utilised (kg DM/ha)	Forage demand (kg DM/AE/year)	Land type carrying capacity (ha/AE)	Area of land type (ha)	Number of AEs for land type (AE)	Paddock Long Term Carrying Capacity (AE)	Property Long Term Carrying Capacity (AE)
Codes				**PG**	**U**	**PU**	**FD**	**LTCC**	**Area**	**LT AE**		
Formulae						=PG x U	FD	= FD / PU	Area	= Area / LTCC	= Sum LT AE	**1016**
Pullyabarraback	Box on grey clay	A	4	2,400	25%	600	2,920	4.87	1200	246.6		
	NL ironbark sodic duplex	A	4	1,850	25%	463	2,920	6.31	400	63.4		
	NL ironbark brown duplex	A	4	2,250	25%	563	2,920	5.19	400	77.1		
	Brigalow gidgee scrub	A	0	2,750	30%	825	2,920	3.54	600	169.5		
											557	
Kickabrickalong	Brigalow gidgee scrub	A	0	2,750	30%	825	2,920	3.54	800	226.0		
	NL ironbark on sodic duplex	A	4	1,850	25%	463	2,920	6.31	500	79.2		
	Box on grey clay	A	4	2,400	25%	600	2,920	4.87	750	154.1		
											459	

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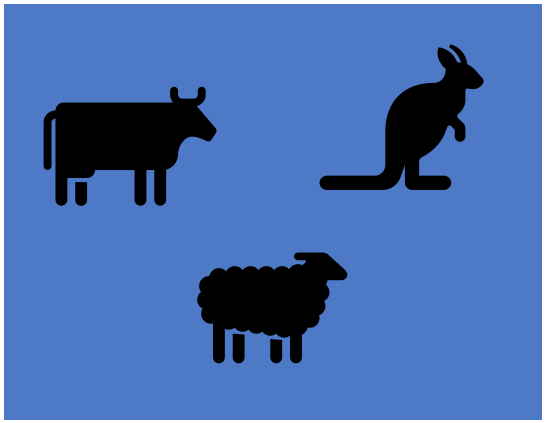
EcoRich GRAZING

Key take home messages / learnings



1. The standard animal has been defined as:
   - 2 ¼ year-old, 450 kg Bos taurus steer
   - zero weight change
   - walking 7 km/day.

2. The Australian feeding standards (NRDR) do not predict the intakes of ruminants grazing tropical forages well

3. Either the modified or unmodified NRDR equations can be used to estimate the AE rating

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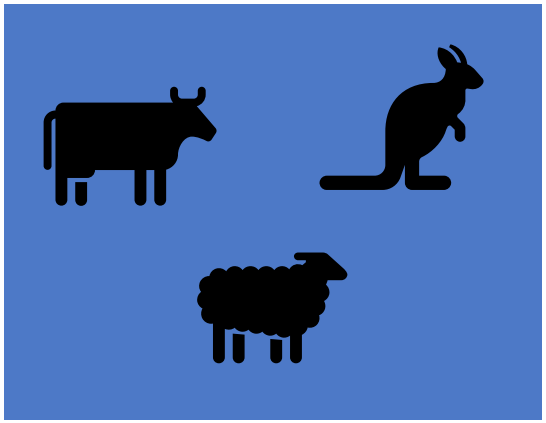
Key take home messages / learnings



4. The intake of cattle can be estimated by multiplying the AE rating by an intake constant that varies between 7.5 and 8.5 kg DM/AE/day, depending on the productivity of the grazing enterprise

5. The application of the AE system can be as simple or complex as the operator wishes.

Questions?

Frequently Asked Questions

How does this approach account for animals grazing a tropical pasture?

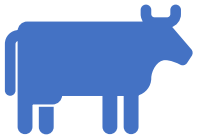
- Energy requirements of an AE using NRDR 2007 equations is **73 MJ**
- Energy requirements of an AE using modified equations for tropical pastures in Northern Australia is **64 MJ**
- Providing the energy requirements of the animal(s) in question and the standard animal are calculated using same equations, the AE rating is effectively the same

Why is Metabolisable Energy (ME) demand used to derive AE's and not intake?

- ME DEMAND is a function of **animal only variables** (breed, sex, weight, production etc.)
- …whereas INTAKE is **influenced by environmental factors** (primarily diet quality).

- Using ME means that a 300kg Hereford steer gaining 0.6kg/day is 1.25AE whether he is at Armidale, Amby or Alice Springs, whereas his intake may be different across those three locations.

Why is the intake constant figure highest for low production areas?

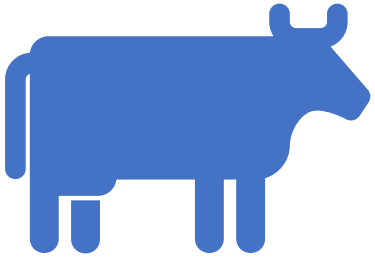


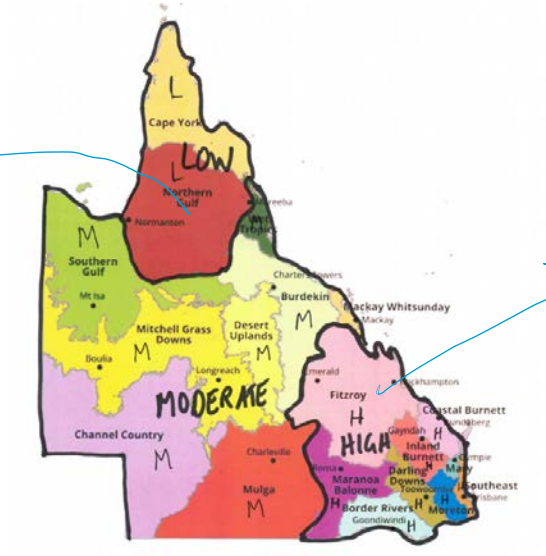
The **poorer the quality of diet** (less nutrients), **the MORE an animal needs** to eat to satisfy its production requirements

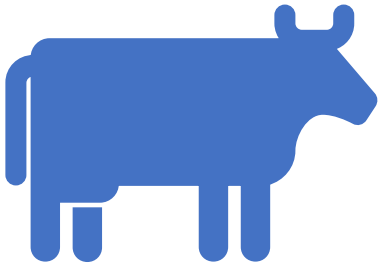
BUT…

In practice, they will eat LESS because it is less palatable and digestible (**doesn't taste very good**)

Why is the intake constant figure highest for low production areas?







Steer at Georgetown

Steer at Biloela

The **poorer the quality of diet** (less nutrients), **the MORE an animal needs** to eat to satisfy its production requirements

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Example

How much would a typical low production zone 3yo female *(avg weight of just under 400kg & repro rate < 60%*) need to eat per day to meet average performance benchmarks for the region?

- AE rating = 1.18
- Intake constant = 8.5kg/day
- 1.18 x 8.5 = 10 kg/day

How much would a typical high production zone 3yo female *(avg weight 490kg & repro rate > 70%)* need to eat per day to meet average performance benchmarks for the region?

- AE rating = 1.61
- Intake constant= 7.5kg/day
- 1.61 x 7.5 = 12.1 kg/day

Why should we use 55% DMD as a standard when we know it goes to much less in the dry season of northern Australia?

- Whilst diet quality does vary across seasons and regions, **55% is a representative figure** for northern Australia.
- Change in diet quality does not have a big influence on the **AE rating** of an animal (i.e. it's ME demand **relative** to the standard animal, if the same DMD is used for both calculations).
- The regional differences in diet quality are also reflected in the adjusted **intake constants** based on productivity.

How does the simple model account for the land type variability within a region?

- The simple model does not work on a land type basis; it works at a regional level first but if you think growing cattle on your property would have a different weight gain to the regional weight gains quoted in each column
- e.g. between 110 kg/year and 150 kg/year using an intake constant of 8 kg/AE/day, you can choose another regional intake constant to suit.
- It is not meant to work at a land type level for a property. There will be some properties, say around Alpha, that have higher fertility soils than the Burdekin regional average and they might choose to jump from an intake constant of 8 kg to the high production intake constant of 7.5 kg, but they must use the AE ratings for animals from that same column