

\$ensible \$upplementation

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@QldAgriculture
@futurebeef
#eatqld
#beefextension

Outline

Today

- Practical cattle nutrition
- Limiting nutrients
- Legumes
- Pasture intake

8 September

- Herd management and nutrition

15 September

- Choosing and managing supplements



Online resources



<https://futurebeef.com.au>



www.qrida.qld.gov.au



<https://www.longpaddock.qld.gov.au/>



<https://farmhub.org.au/>



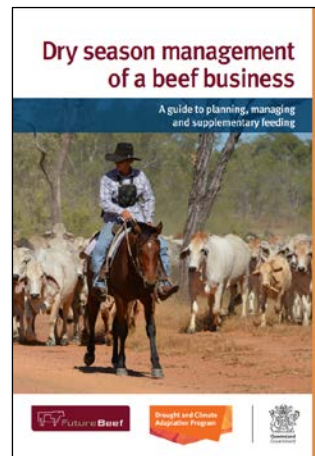
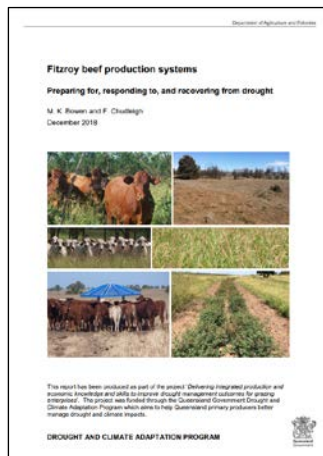
Rural Financial
Counselling Service

<https://www.rfcssq.org.au/>



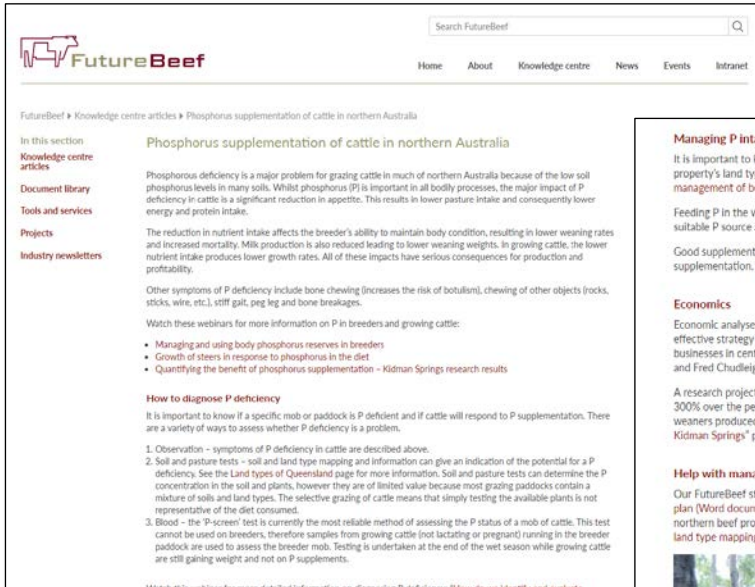
<https://www.daf.qld.gov.au/business-priorities/agriculture/disaster-recovery/drought/assistance-programs>

Handy resources

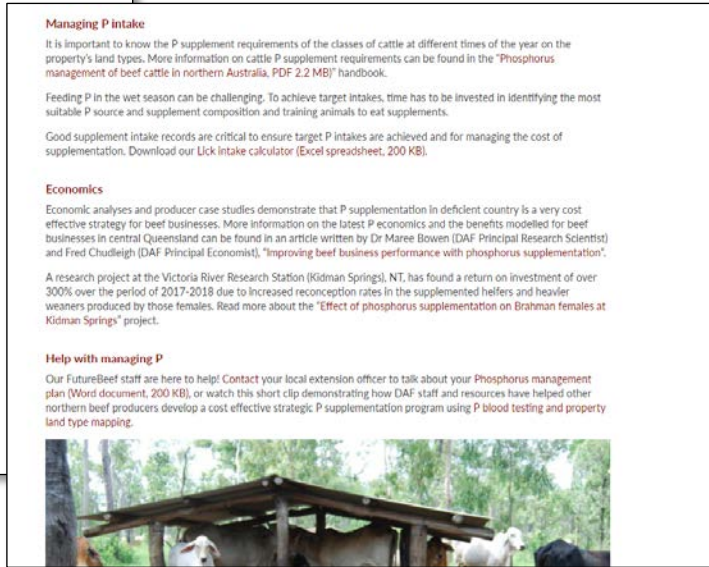


FutureBeef website - Phosphorus

<https://futurebeef.com.au/knowledge-centre/phosphorus-supplementation-of-cattle-in-northern-australia/>



The screenshot shows the FutureBeef website interface. At the top left is the FutureBeef logo. A search bar is located at the top center. Navigation links for Home, About, Knowledge centre, News, Events, and Intranet are visible. The main content area displays the article title 'Phosphorus supplementation of cattle in northern Australia'. A sidebar on the left contains sections for 'In this section', 'Knowledge centre articles', 'Document library', 'Tools and services', 'Projects', and 'Industry newsletters'. The article text discusses phosphorus deficiency in grazing cattle, its symptoms, and management strategies. It includes a section on 'How to diagnose P deficiency' with three numbered points: 1. Observation of symptoms, 2. Soil and pasture tests, and 3. Blood testing (the 'P-screen' test).



The screenshot shows the 'Managing P intake' article. It explains the importance of knowing P supplement requirements for different classes of cattle and land types. It mentions a handbook titled 'Phosphorus management of beef cattle in northern Australia, PDF 2.2 MB'. The article also discusses the challenges of feeding P in the wet season and the importance of good supplement intake records. A section on 'Economics' highlights that P supplementation is a cost-effective strategy for beef businesses, citing research from Queensland and Northern Territory. A research project at the Victoria River Research Station is mentioned. The article concludes with a section on 'Help with managing P', encouraging producers to contact their local extension officer or watch a short clip demonstrating DAF staff resources. Below the text is a photograph of several cows standing under a wooden shelter in a field.



Upcoming free workshops

Central Queensland

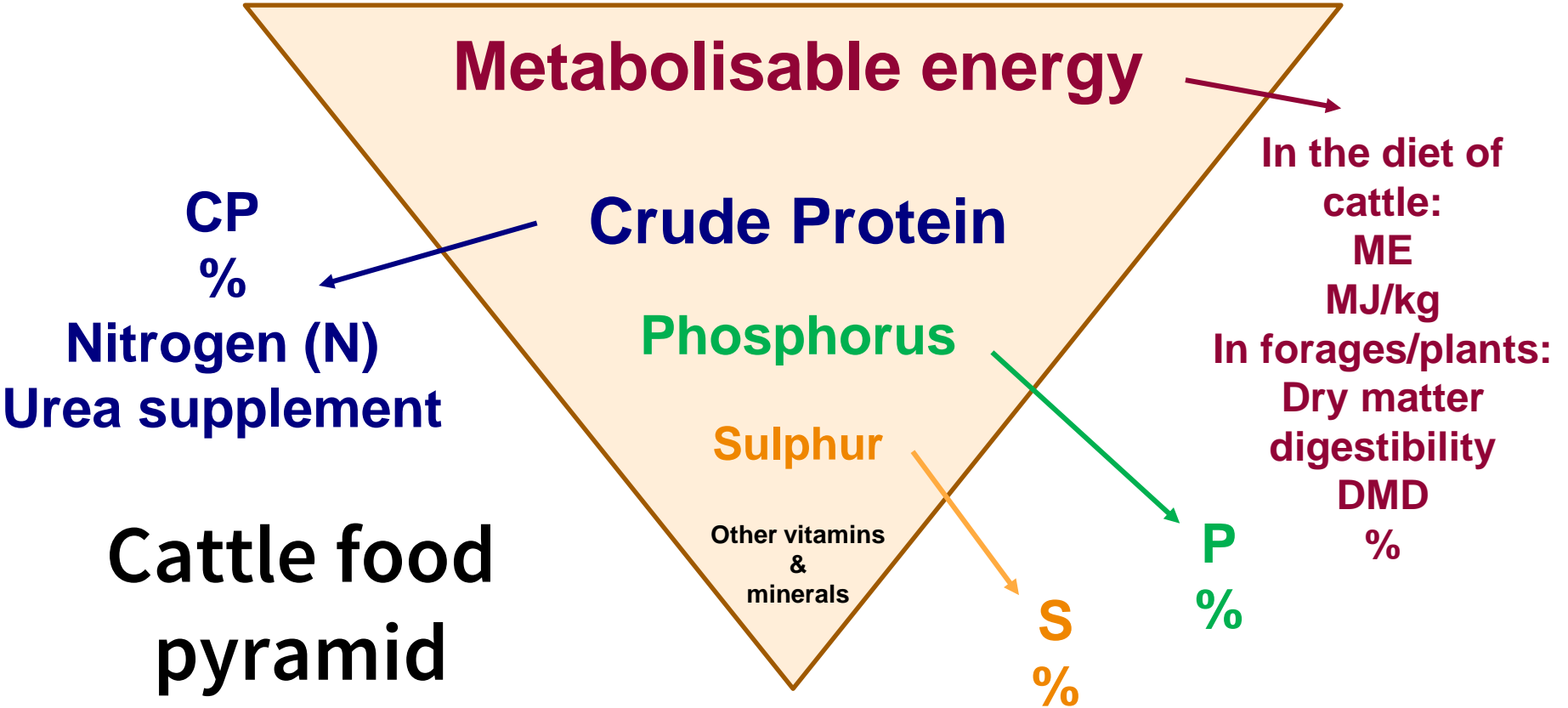
- Mon 20th September - Gin Gin
- Tues 21st September - Miriam Vale
- Wed 22nd September - Gracemere
- Tues 26th October - Biloela
- Wed 27th October - Taroom
- Fri 29th October - Alpha

Southern Queensland

- Tues 23rd November – Gympie
- Wed 24th November – Proston
- Thurs 25th November - Biggenden



Beef cattle nutrition 101



Vitamins and Minerals

Macro nutrients

Need grams per day

- Phosphorus
- Calcium
- Magnesium
- Sodium
- Sulphur
- Potassium
- Chlorine

Micro nutrients

Need milligrams per day

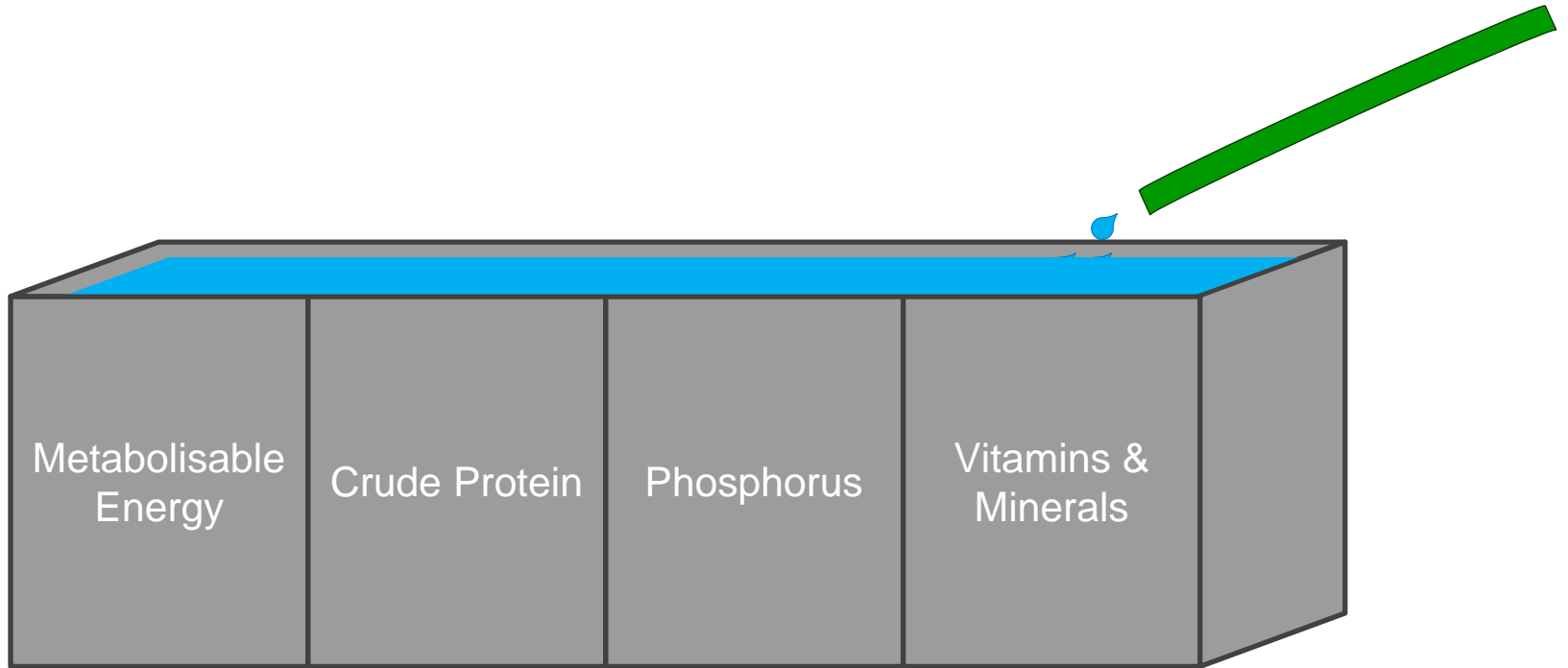
- Copper
- Cobalt
- Selenium
- Iron
- Iodine
- Manganese
- Zinc

Vitamins

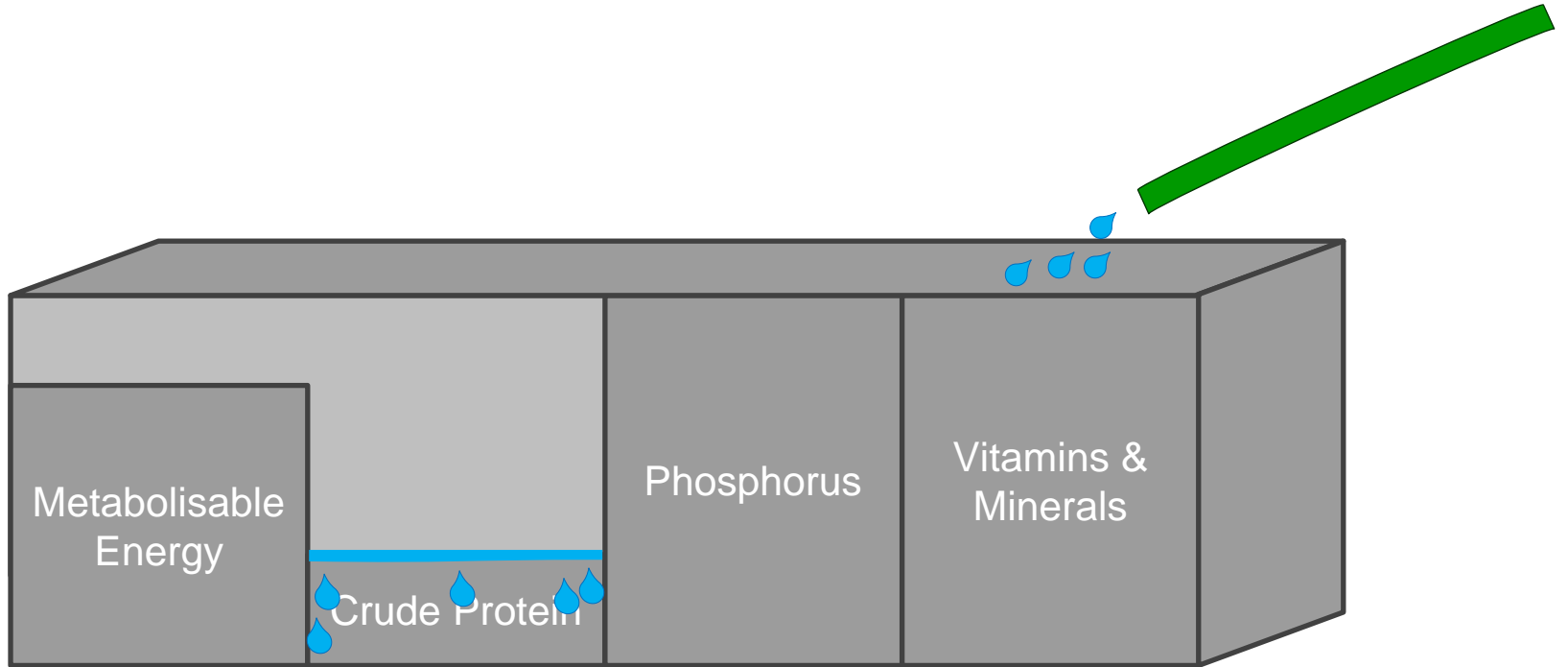
- Environment
- Pasture
- Rumen

Except Phosphorus, deficiencies in vitamins and minerals are uncommon and only occur in very specific circumstances

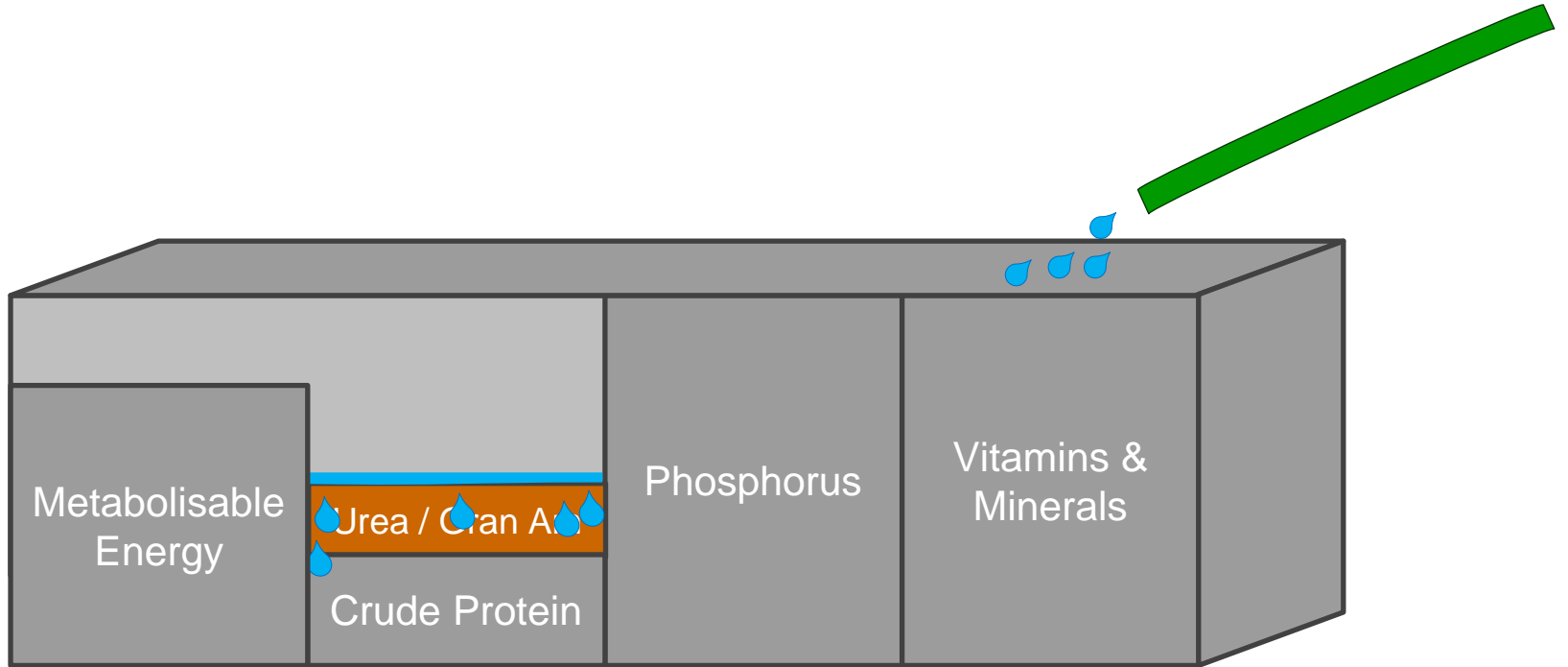
What is the most limiting nutrient?



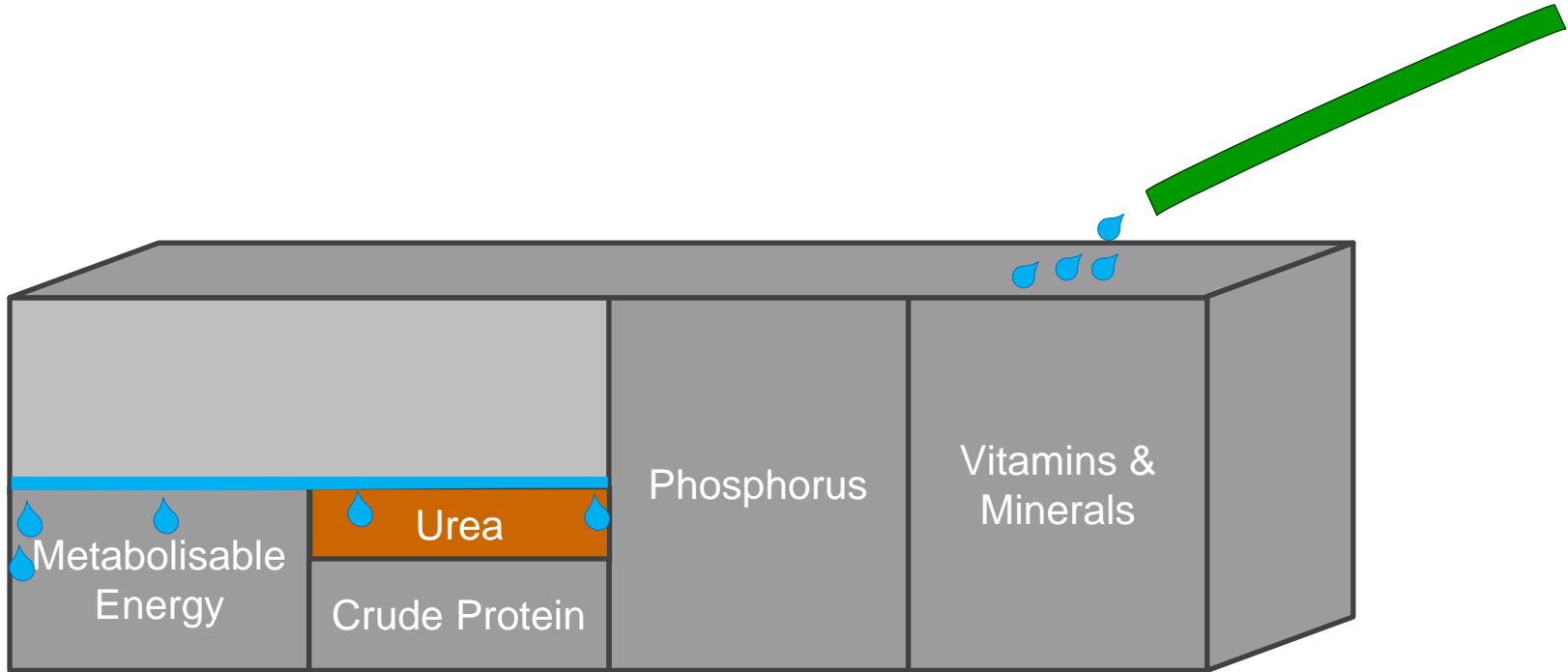
EARLY DRY SEASON



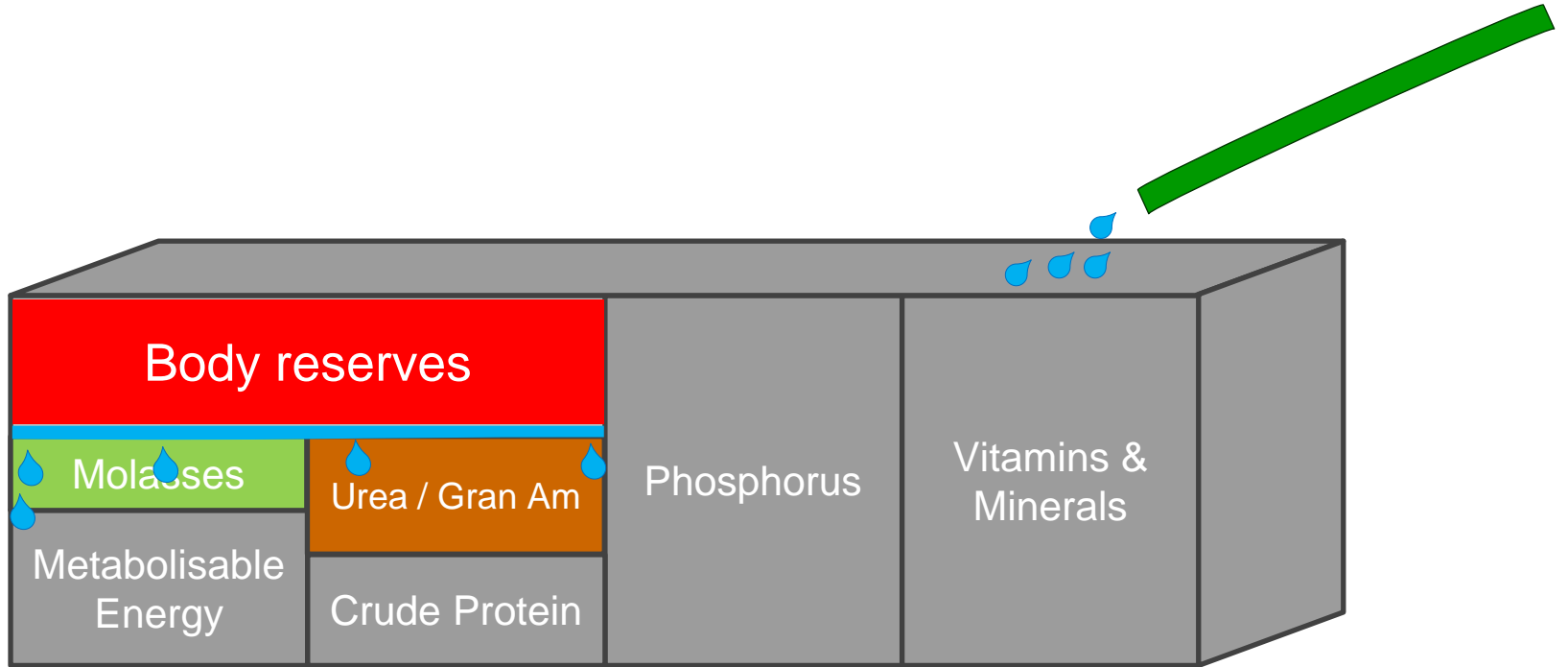
EARLY DRY SEASON



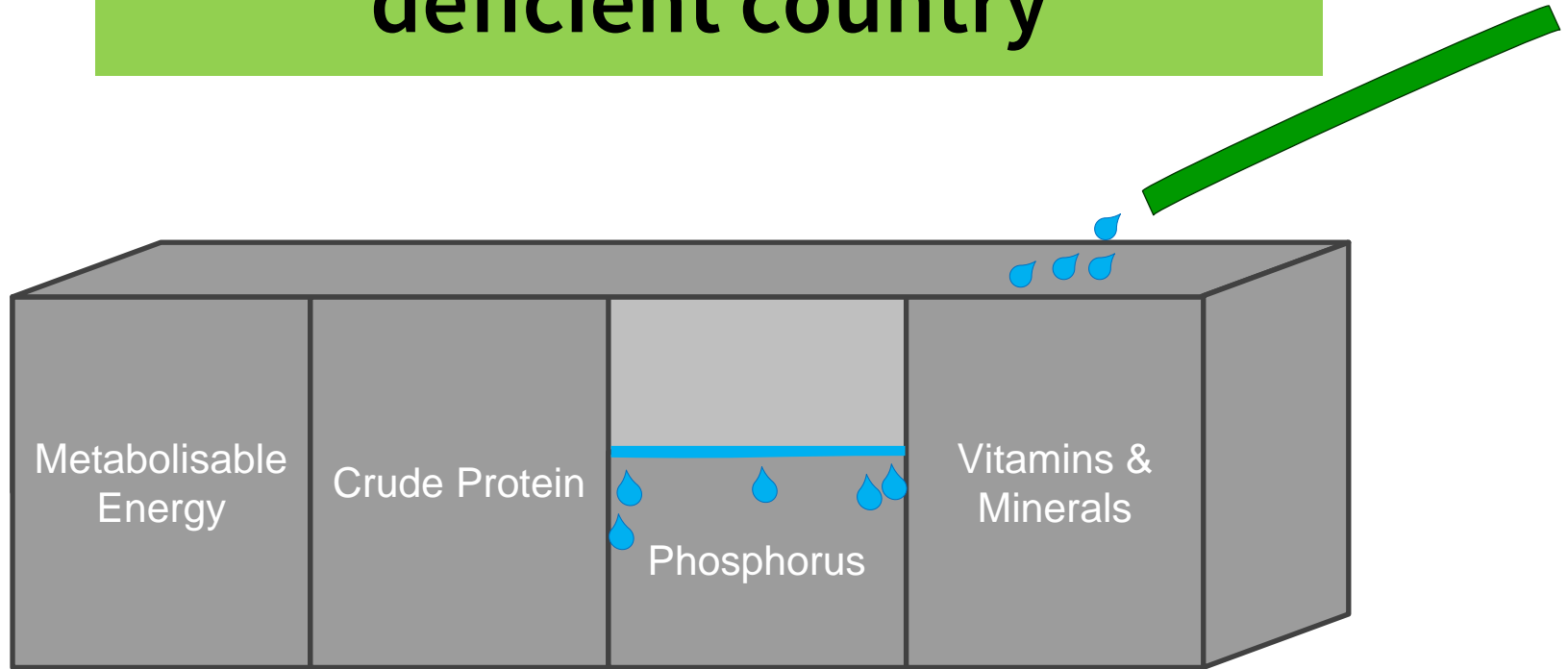
LATE DRY SEASON



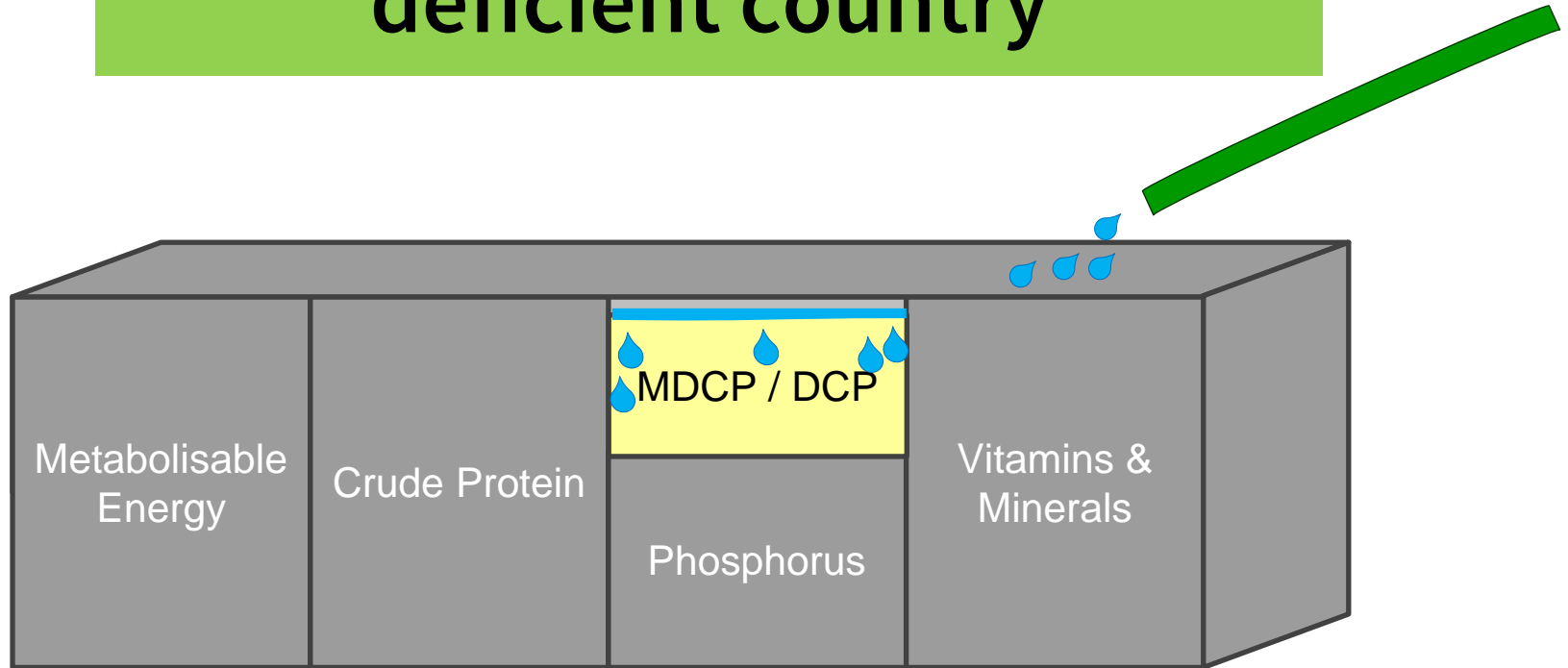
LATE DRY SEASON



WET SEASON on Phosphorus deficient country



WET SEASON on Phosphorus deficient country



Energy

- Energy intake drives daily liveweight gain (kg/d)
- Forage with a high dry matter digestibility has a double effect in increasing energy intake
 - greater energy per kg dry matter of feed consumed, and
 - the cattle can physically consume more kg DM/day



Energy

- Pasture intake depends on:
 - liveweight
 - status of animal
 - quality of pasture
- On tropical pastures daily intake generally 1.5-2.4% of body weight for most of the year
- Legumes provide **energy** and **protein**



Protein

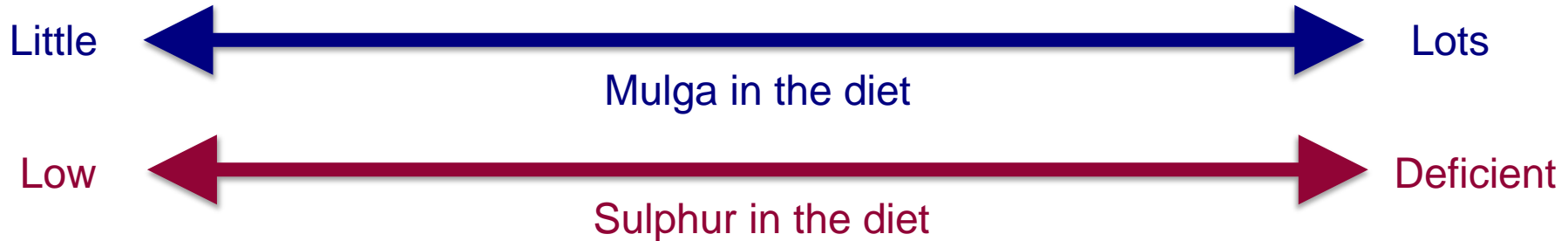
- Protein feeds microbes in the rumen
- As the dry season progresses
 - Less protein available for rumen microbes
 - Digestion slows
 - Feed intake is reduced
- Urea and sulphate of ammonia supply ammonia to rumen microbes
 - Increases microbial protein production
 - Feed intake increases 10-30%

Protein
content
decreases

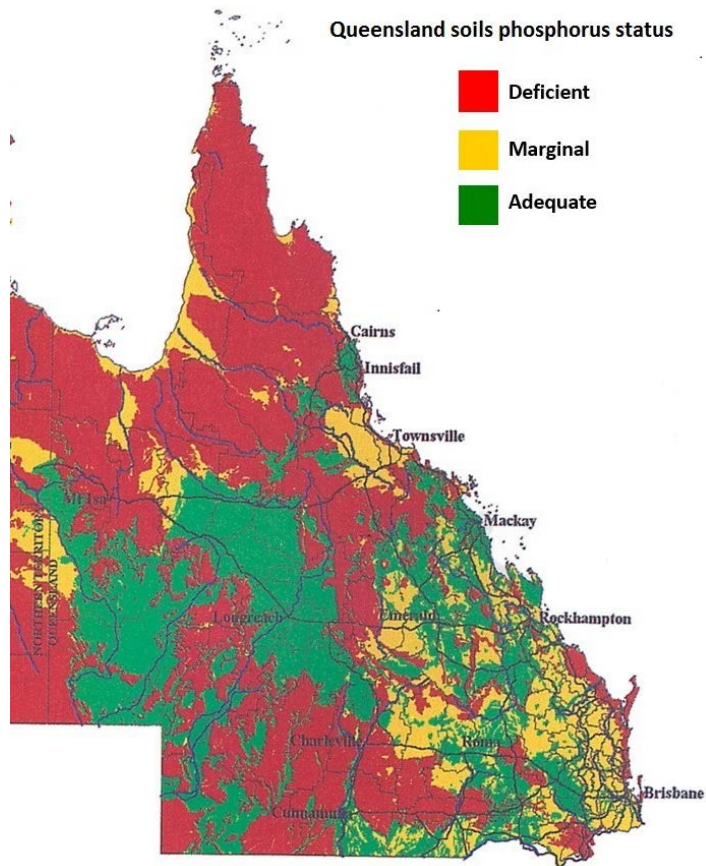


Sulphur

- Microorganisms in the rumen use sulphur to synthesis protein
- Sulphur becomes more of an issue the more mulga is in the diet
- When urea is fed, sulphur has to be added for effective use of the N



Phosphorus deficient country



Categories for soil P concentration

Acutely deficient	2-3 ppm
Deficient	4-5 ppm
Marginal	6-8 ppm
Adequate	>8 ppm

Colwell P – bicarbonate extractable P
ppm = mg/kg

P deficiency - cows



Reduced appetite and grass intake
= reduced body condition

- Some obvious signs of severe deficiency
- Deficiency causes long term effects - P is mobilised from the bones during lactation
- Reduced conception & weaning rates
- Reduced milk production → reduced calf growth rates and lower weaner weights
- Increased mortality
- Lower cull cow weights

P deficiency – growing animals

Reduced appetite and grass intake
= reduced body condition



Low growth rates



P depletion & repletion

Research in steers shows:

- When P in the diet becomes deficient, the effects of depletion can be seen as early as 6 weeks
- When P is supplemented and the diet becomes adequate, repletion happens in a matter of days



P depletion & repletion

- Post weaning, we assume the same rates of repletion for cows as steers

BUT

- Cows need to replete & store much more P, as they have mobilised so much during lactation
- Cows can replete P even when losing weight in the dry season



Benefits of P supplementation

On deficient and acutely deficient country:

- **Feed intake increased by 10-60%**
- Increased liveweight gain of 20 - 100kg per year depending on pasture and legume quality
- Decreased breeder mortality by 3-5%
- Increased weaning rates by 6-15%
- Increased weaner weights by 15kg



What quality are different forage sources?

Forage	DMD	CP	P	S
Maintenance	50%	5%		
Grass	45 – 60%	4 – 12%	Deficient on low P soils	Adequate
Herbage & legumes	50 – 70%	15 – 30%	Adequate	Adequate
Mulga	45%	10 – 14% but only 30-40% digestible	Deficient	Deficient

Nature's supplement: LEGUMES

- Source of energy and protein
- Produce more beef kg/ha/yr
 - Increased stocking rate
 - Increased daily liveweight gain
 - Increased grazing period

Very profitable
But, management is key!



Leucaena biomass
1,922 kg DM/ha



Leucaena biomass
220 kg DM/ha



Leucaena biomass
255 kg DM/ha



Leucaena biomass
1,400 kg DM/ha

Effects

Live weight

gain

0.55 kg/d x 76 d

0.29 kg/d x 75 d

0.94 kg/d x 121 d

Crude protein (%)

30
20
10
0

Diet leucaena (%)

100
80
60
40
20
0

April 2013

August 2013

November 2013

February 2014

Legumes increase diet quality

Intake is critical (must be able to fill their belly)

Compensatory gain

—+— Grazing period

—■— Diet CP

—▲— Diet leucaena

Leucaena CP average 23% over the year

Breeder nutrition in the dry season

Diet quality provided by pasture:

CP = 4.77% DMD = 47%

450kg cow eating 1.5% of her bodyweight

Breeder nutrition in the dry season

Diet quality provided by pasture:

CP = 4.77% DMD = 47%

450kg cow eating 1.5% of her bodyweight

	CP g	ME MJ	Dry matter intake kg	Can she physically eat it?
Pasture only	333	44	7	



7kg
dry matter

Breeder nutrition in the dry season

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Pasture + urea	400 + 150	53	8.4	



8.4kg
dry matter

1.4kg
dry matter

7kg
dry matter

Breeder nutrition in the dry season

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Dry cow - last trimester	Requirements	570	60	9.5	



9.5kg
dry matter

1.1kg
dry matter

1.4kg
dry matter

7kg
dry matter

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Dry cow - last trimester	Requirements	570	60	9.5	X
	Pasture only deficit	237	16	Managed with body condition	
	Pasture + urea deficit	20	7		

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Dry cow - last trimester	Requirements	570	60	9.5	X
	Pasture only deficit	237	16		
	Pasture + urea deficit	20	7		
Lactating cow with calf up to 4 months	Requirements	911	80	12.7	



12.7kg
dry matter

1.1kg
dry matter

3.2kg
dry matter

1.4kg
dry matter

7kg
dry matter

Breeder nutrition in the dry season

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450kg cow eating 1.5% of her bodyweight

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	Pasture only	333	44		
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	Pasture only deficit	237	16		
	Pasture + urea deficit	20	7		
Lactating cow with calf up to 4 months	Requirements	911	80	12.7	X
	Pasture only deficit	578	36		
	Pasture + urea deficit	361	27		

Need to consider body condition, time of calving, time of weaning and pasture availability

2-3 kg per day of molasses, copra meal or sorghum

Managed with \$\$\$\$\$\$ when body condition runs out

Summary

- Energy > protein > Phosphorus > other vitamins & minerals
- Legumes are nature's supplement
- Pasture intake is critical – forage budgeting can help – StockTake App
- Managing body condition in breeders is key – more next week
- Supplementation should help pasture intake, not substitute pasture



Extra support

- FutureBeef website
- DAF extension officer, phone: 13 25 23
- Workshops in CQ and SQ – FutureBeef event calendar
- Webinars:
 - 8 September - Herd management and nutrition
 - 15 September - Choosing and managing supplements

