RUMEN8
Easy dairy & beef cattle diets

NEADAP
Netherlands East African Dairy Partnership

Dairy cattle nutrition in the tropics using Rumen8

PART 5: Rumen8 Farm Walk

By M. Staines, J. Creemers and H. Perdok – Jan. 2023

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- This course has been created by Rumen8 Nutrition Pty Ltd, with expert input from ProDairy East Africa Ltd and ‘PUM Netherlands Senior Experts’ with experience in East Africa
- Information presented in parts ONE & TWO of this course is based in part on material developed by Dairy Australia

- East Africa photo credits: Jos Creemers, Hink Perdok, Martin Staines, Victor Otieno, Tseard van der Kooi, Nieke Westerik and Imre van der Kolk and SNV

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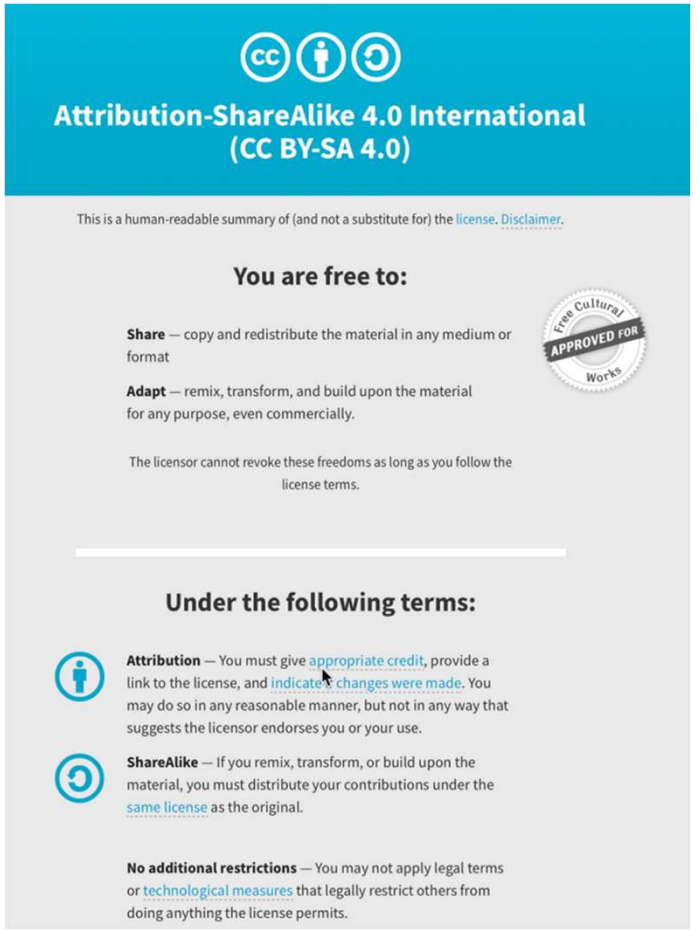

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Parts FIVE & SIX
Practical use of Rumen8 on dairy farms

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- Farm walk is an **essential** part of using Rumen8
- Face to face meeting with farmer/manager on farm
- Become a Rumen8 Detective: 'Nutrition in Practice' & 'Body of Evidence'
- Collect management info & data on feeding & animal production
- Set up farm in Rumen8 & assess opportunities for improvements
- Discuss options & agree on plan with farmer
- Remember the 'Art of Feeding' – opportunities to do better?
- Follow-up is **essential**
- 'Practice makes Perfect'

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Course Goal

To improve knowledge and skills of trainees so that they can confidently use the Rumen8 software application to make informed on-farm nutrition decisions to improve farm profit

Part 5A
Farm walk - Introduction

Welcome to the farm

- Make introductions between farm owner/manager and workshop trainees
- Provide an overview of the farm, its history, targets, aims etc. (by workshop presenter or by farm manager)
- Explain details on number and type of animals, on feeding systems/resources available, stage of lactation, current milk production, plans for breeding and calving, etc. etc.
- Briefly outline program
  - Farm walk to practice 'Nutrition in Practice' & 'Becoming a Rumen8 Detective'
  - Collection of all required data & information for Rumen8
  - Rumen8 session: set up current farm & assess opportunities for improvement
  - Discuss options with manager & agree on an action plan

Farm walk essential

- Farm walks are the most essential part of Rumen8. During farm walks information is collected that allows the software to generate meaningful output

Why a farm walk is essential 1/2

- Talk to farmer/manager & farm staff
- Observe farm facilities incl. cow sheds, milking shed, feed-out facilities, water supply etc.
- Observe cows:
  - body condition, health, rumination, manure scores etc.
- Assess forages/pastures and all other feeds used
  - Quantity, quality, storage, pathogens (?)
  - Silage/hay storage
  - Pasture/grazing management
- Observe farm management practices
- Collect records, information, samples etc.

Why a farm walk is essential 2/2

- To involve farm owner/manager in the process of developing recommendations to improve nutritional practices
- To get his/her ‘buy-in’ to maximise the chance that recommendations will be implemented

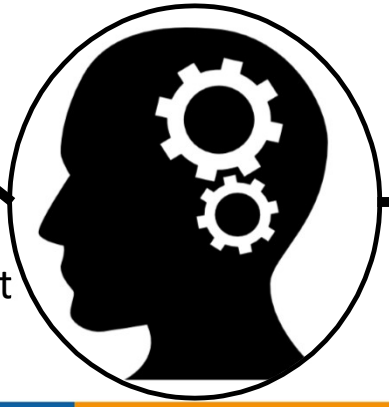
1. Cow observations

2. Feed and water availability

3. Cow environment

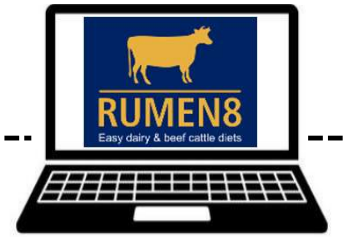
4. Milking (parlour)

5. Assessing level of management

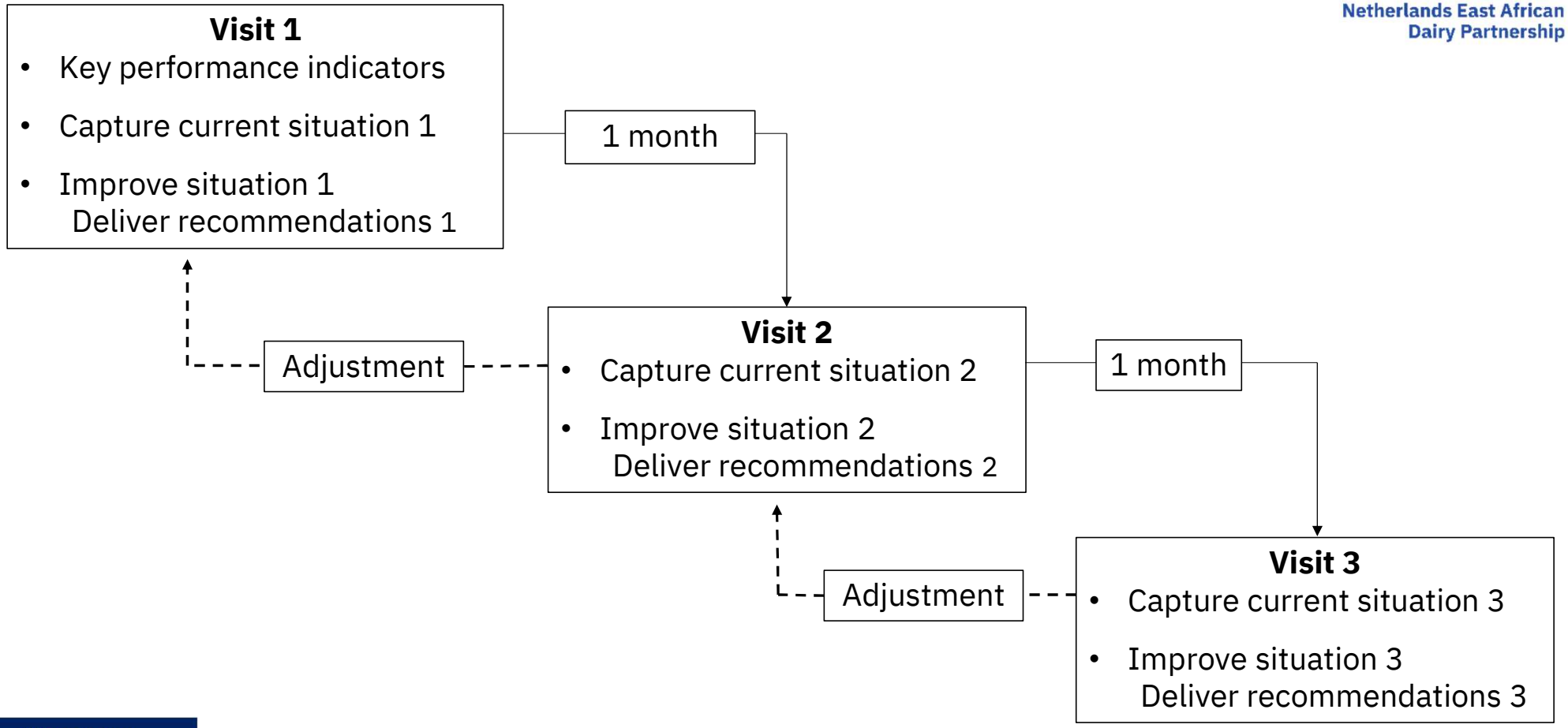


6. Scrutinizing farm records

7. Diet formulation



Repeat visits are crucial!!



Q & A
Discussion

Part 5B
Nutrition in practice

Observation is important

- Good nutrition is reflected in the health and productivity of the herd
- Monitoring of key indicators will aid feeding decisions

Become a Rumen8 detective

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Look for **Cow signals**

- General appearance
- Condition score
- Rumination & rumen fill
- What is in the feed trough (or not....)
- Manure & urine
- Posture & lameness
- Milk composition (if available)

Look for **Feed signals**

- Feed quality incl. appearance, smell
- Conserved forages
  - Appearance, smell, mould?
- Concentrates
  - Appearance, smell, processing
- Pasture & fodder crop quality
- Pasture residuals (grazing)
- Don't forget: water is the 'first feed'

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Assemble a "Body of Evidence"

General cow appearance

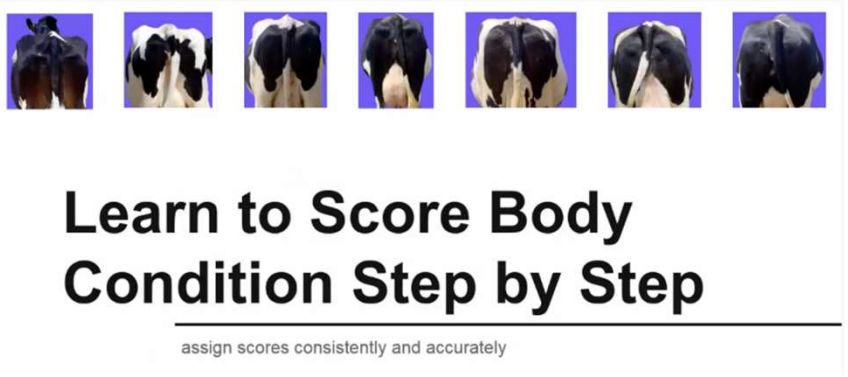
- Signs of good health and nutrition
- Alert, calm and comfortable
- Bright eyed, shiny coat
- Rising easily from a lying position
- Good appetite
- If grazing, cows are with the herd & 1st calvers blend in

Cow comfort including heat stress

- Cow comfort is important
- Heat stress impacts negatively on production, health & reproduction
- Heat stress can kill

Body condition score

- Body condition score is an indication of the energy reserve a cow is carrying in the form of body fat
- Indicates the long term nutritional status of the cow
- Changes in condition score usually occur over a period of weeks or months
- Ideal score is 3.5 at dry off & calving (1 – 5 scale)



https://m.youtube.com/watch?v=wASXNn_CTCU

Body condition scoring

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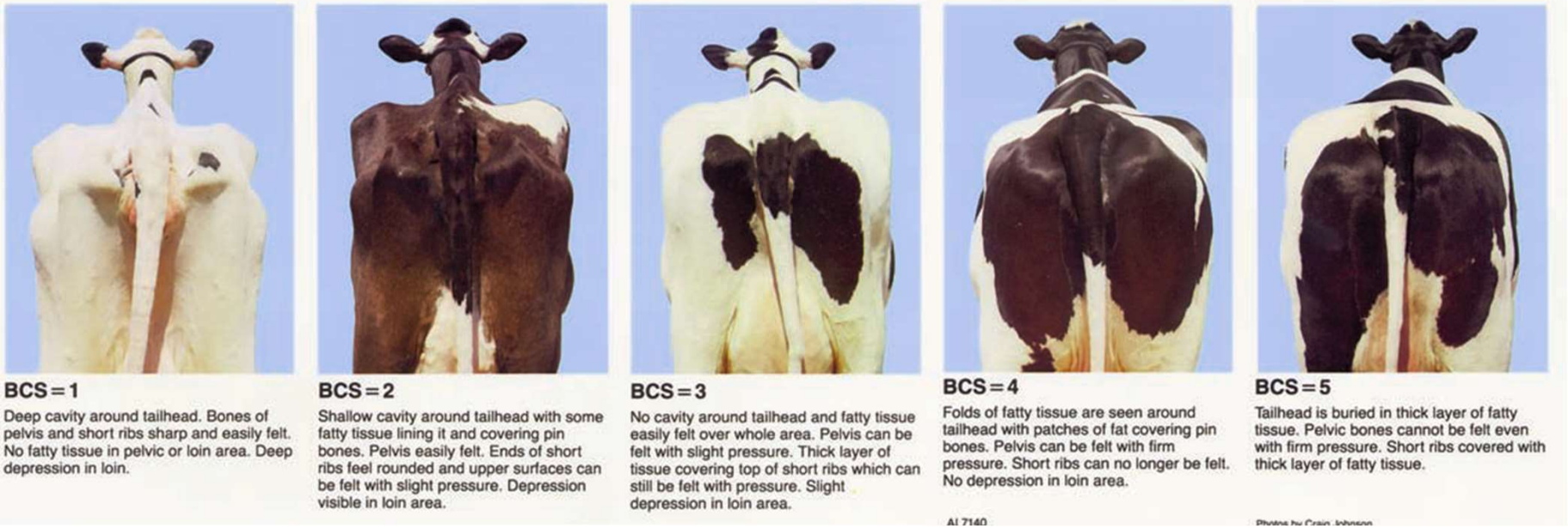
No Matter How You Look At It...

Body Condition Scoring

...Is An Important Part of Modern Dairy Management.



BCS = 1

Deep cavity around tailhead. Bones of pelvis and short ribs sharp and easily felt. No fatty tissue in pelvic or loin area. Deep depression in loin.

BCS = 2

Shallow cavity around tailhead with some fatty tissue lining it and covering pin bones. Pelvis easily felt. Ends of short ribs feel rounded and upper surfaces can be felt with slight pressure. Depression visible in loin area.

BCS = 3

No cavity around tailhead and fatty tissue easily felt over whole area. Pelvis can be felt with slight pressure. Thick layer of tissue covering top of short ribs which can still be felt with pressure. Slight depression in loin area.

BCS = 4

Folds of fatty tissue are seen around tailhead with patches of fat covering pin bones. Pelvis can be felt with firm pressure. Short ribs can no longer be felt. No depression in loin area.

AL 7140

BCS = 5

Tailhead is buried in thick layer of fatty tissue. Pelvic bones cannot be felt even with firm pressure. Short ribs covered with thick layer of fatty tissue.

Photos by Craig Johnson

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Rumination

- Cud chewing or rumination indicates adequate levels of effective fibre in the diet
- When cows are at rest at least 50% of the herd should be ruminating

Rumen fill scores – lactating cows

Score 1: Cow empty & hungry

Score 3: Just right

Score 5: Too full for lactating cows – fibrous feeds, slow rate of rumen passage which limits intake

- Rumen fill indicates the rate of passage of feed through the rumen and the ability of cows to eat more if offered
- It is an indication of the diet over the previous 6 – 8 hours
- Score 3 is desirable for milking cows
- Score 4-5 for dry cows

Images: D. Zaaijer, W.D.J.Kremer, J.P.T.M. Noordhuizen (2001), in J. Hulsen, Cow Signals.

Manure scoring

- Evaluation of manure
  - appearance
  - consistency
  - particle size
  - whole grain content

- Provides information on rumen function and digestion of the diet

Manure scores 1/2

	**Score 1**	Very liquid manure with the consistency of pea soup. May “arc” from the rump of the cow. Dietary causes include excess minerals, protein or starch, or insufficient fibre. Check diet balance and increase effective fibre intake immediately.
	**Score 2**	Runny manure which does not form a distinct pile. Manure will splatter on impact and may form loose piles less than 25mm in height. Typical of fresh cows, cows on high quality pasture or with insufficient fibre in the diet. Consider increasing effective fibre intake.
	**Score 3**	Manure has a porridge-like consistency. Forms a soft pile 40 – 50mm in height, which may have several concentric rings and a small depression in the middle. Makes a plopping sound and will stick to the toe of your shoe. Ideal. No action required.

Manure scores 2/2

Score 4	Thick manure that sticks to your shoe and readily forms piles that are over 50mm in height. Typical of dry cows and heifers on high roughage diets. In lactating cows, consider reducing effective fibre intake and increasing grain or protein in the diet
Score 5	Manure appears as firm faecal balls. Very high roughage diets and dehydration will contribute to this manure type. Consider reducing effective fibre intake and ensure adequate drinking water is available

Adapted from 'Evaluating manure on farm' Dr M Hutjens, Univ Illinois, 1999

Manure colour and consistency as affected by dietary protein and dietary carbohydrates

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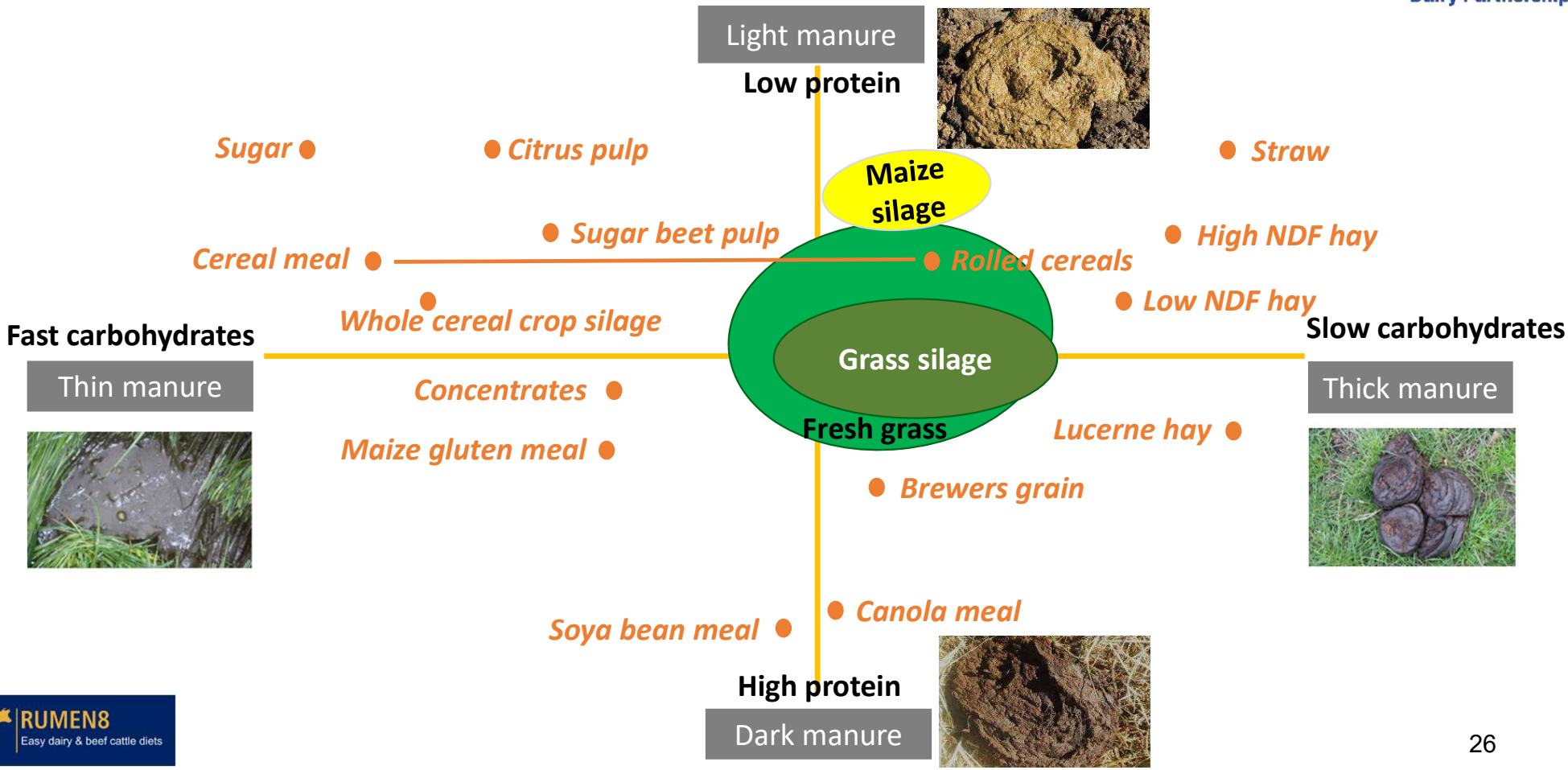

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Manure particle size

- A high proportion of fibre particles longer than 2cm indicates poor fibre digestion. May be due to:
  - Insufficient effective fibre
  - Poor rumen mat formation
  - Poor rumination
  - Poor rumen function

Whole grains in manure

- Excessive amounts of whole grain in manure may be due to
  - Insufficient effective fibre
  - Poor rumen mat formation
  - Poor rumination
  - Rapid flow through the rumen
  - Poor rumen function due to low pH
  - Inadequate grain processing

Urine

- Excess protein in the diet is indicated by
  - Urine that smells strongly of ammonia
  - Urine burns in paddocks
- Protein and energy content of diet may need adjustment

Lameness

- Sore feet and lameness may have a nutritional cause
  - Acidosis may result in lameness
- Other causes of lameness
  - Poor animal handling practices
  - Excessive standing on concrete
  - Poor walking tracks
  - Prolonged wet conditions
  - Disease e.g. footrot

Locomotion Score 1

Clinical Description: ***Normal***

Description - *Stands and walks normally. All feet placed with purpose*

Locomotion Score 2

Clinical Description: ***Mildly lame***

Description - *Stands with flat back, but arches when walks. Gait is slightly abnormal*

Locomotion Score 3

Clinical Description: ***Moderately lame***

Description -*Stands and walks with an arched back. Short strides with one or more legs*

Locomotion Score 4

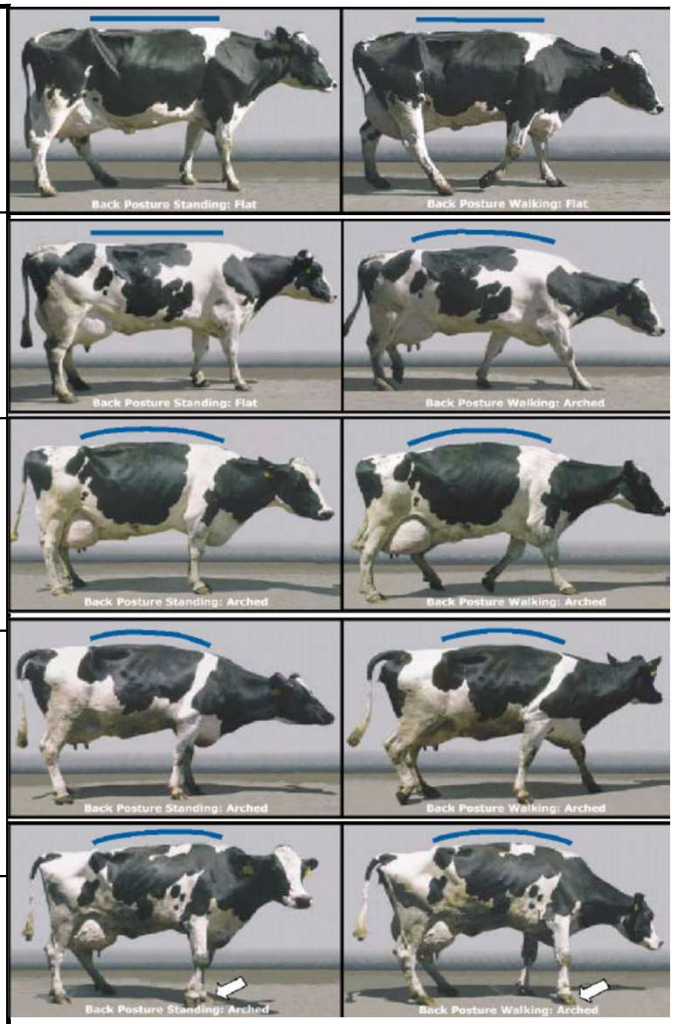
Clinical Description: ***Lame***

Description - *Arched back standing and walking. One or more limbs favoured but at least partially weight bearing*

Locomotion Score 5

Clinical Description: ***Severely lame***

Description - *Arched back, refuses to bear weight on one limb. May refuse or have great difficulty moving from lying position.*



Locomotion Scoring of Dairy Cattle: *Zinpro, adapted from Sprecher, D.J.; Hostetler, D.E.; Kaneene, J.B. 1997. Theriogenology 47:1178-1187 and contributions from Cook, N.B., University of Wisconsin.*

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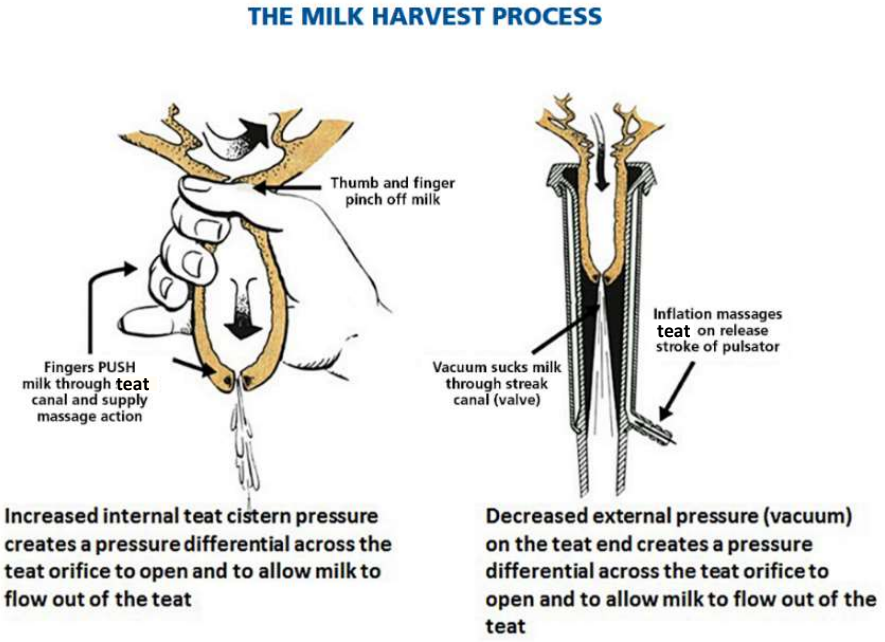
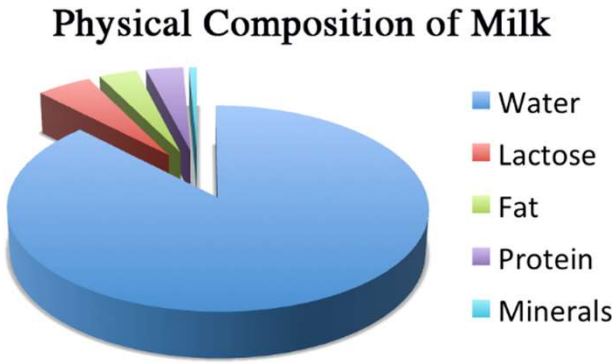
Milking routine

- Observe practices during milking
  - Cow behaviour
  - Human behaviour
  - Hygiene



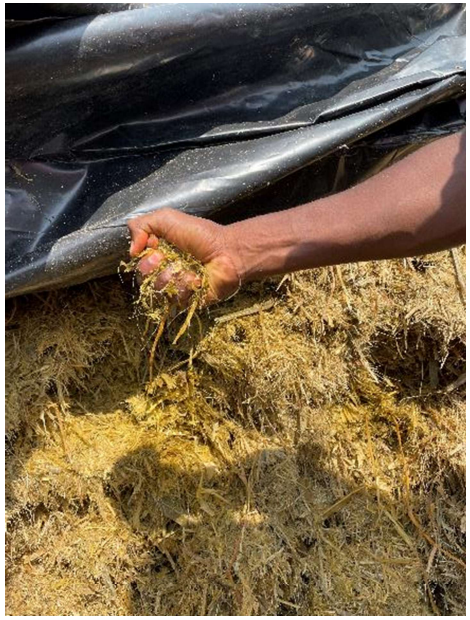
Milk composition

- Is milk composition routinely measured on your farm(s)?
- Some milk payment systems take fat content and/or protein content into account
- Milk composition can be a valuable farm management tool
- Normal ratio of fat:protein is about 1.0 : 0.8
- Sudden changes in milk fat or milk protein need investigation
- Depressed milk fat may indicate insufficient effective fibre
- Depressed protein may indicate insufficient energy

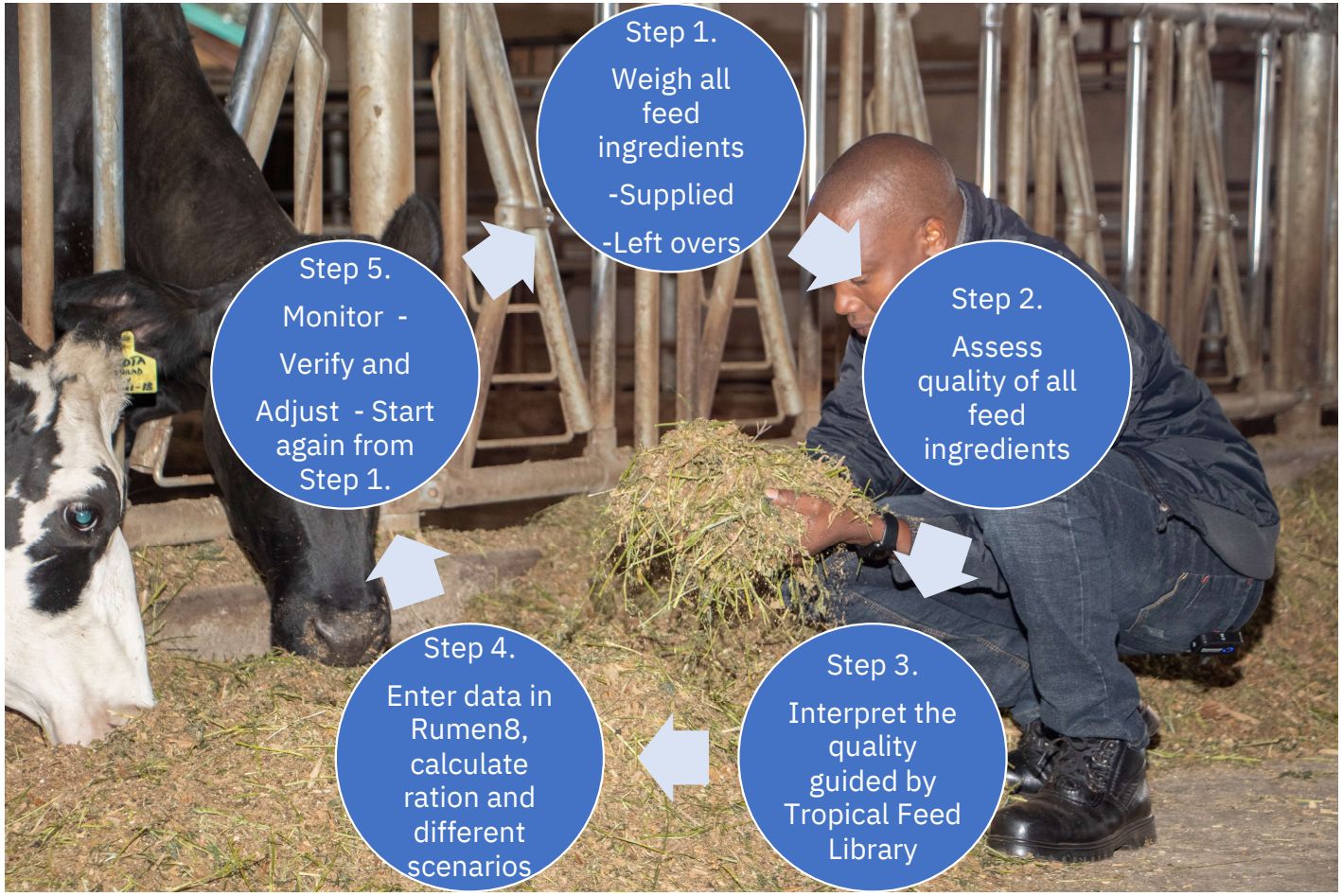


Assessing feed quality

- Assessing feed quality is essential



Feed quality assessment loop



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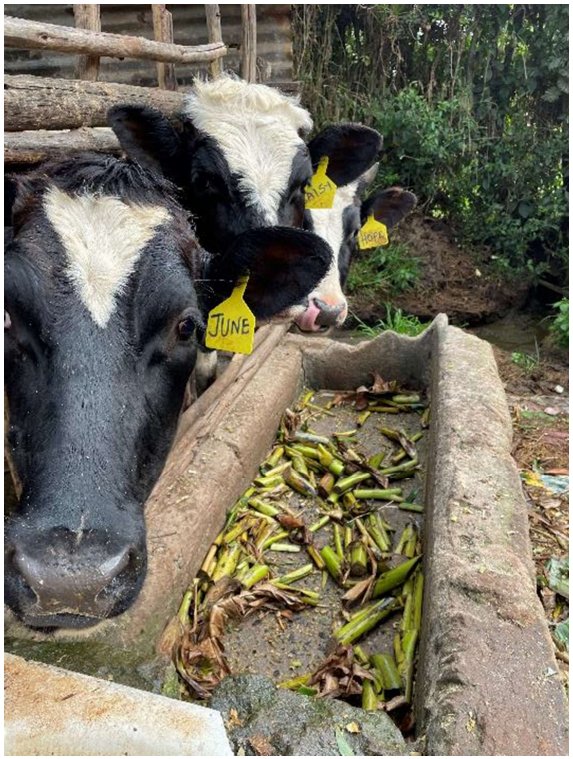
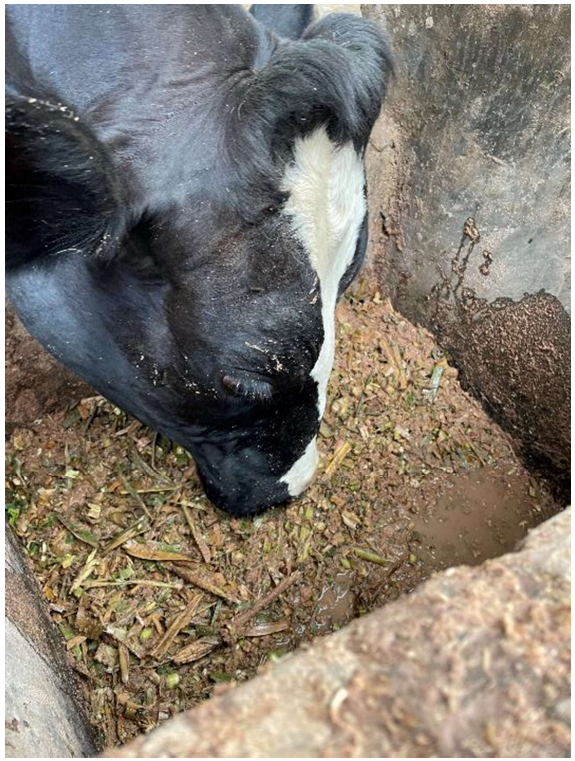
Assessing feed refusals in stall-fed cows

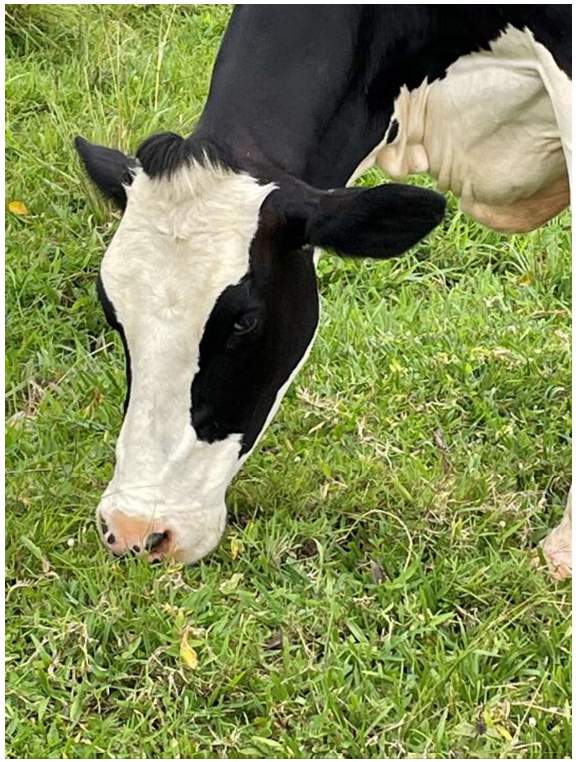


- An empty feed trough often indicates that cows are hungry. Do cows have fresh feed available all the time?
- What is the amount and condition of feed refusals just before the next supply of fresh feed is supplied?
- Are left-overs of sufficient quality to feed to dry cows?
- Are feed troughs cleaned daily?



Pasture residuals (for grazing systems)

- Over-grazing indicates cows are hungry. More supplementary feed is required to meet nutrient requirements for cows. Also overgrazing damages pasture swards and leads to poor pasture growth rates.
- Under-grazing indicates cows are not hungry. Cows may be receiving more supplementary feed than they need. Pasture is often the cheapest feed source so make sure it is well used. Under-grazing will result in declining pasture quality



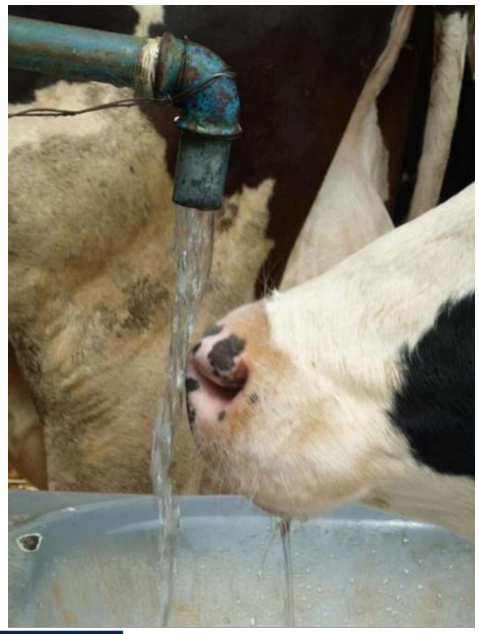
Pay particular attention to silages

- Silage can be an excellent means of conserving forages
- Requires good management to be successful
- Poorly made silage can result in large losses in feed quality/quantity
- Heating during ensiling and/or feed-out is a good indicator that the ensiling process is sub-standard
- Excessive heating is caused by aerobic respiration during ensiling or at feed-out. Heat damage to ensiled forage causes:
  - Reduced digestibility & ME
  - Reduced palatability & feed intake
  - Increased proportion of bound protein which becomes unavailable to animal

  (Note well-made silage has increased protein degradability compared to original forage)

Assessing water supply & quality

- Clean water is essential 24/7



Introducing the ‘Body of Evidence’

- Observations on cows and feeds are an important aspect of dairy cow nutrition
- These observations become a “body of evidence” that supports nutrition decision making and indicate when change is needed
- Walk amongst cows (in shed or field) and make notes on what you see
- Use the ‘Body of Evidence’ worksheet (next slide)

BODY OF EVIDENCE	Farm name:		Date:	
INDICATOR	**Target**	**Average score (if appropriate)**	**Satisfactory Y/N**	**Comment / Action required**
ASK THE FARM MANAGER				
Any unexpected / sudden change in milk volume?	On or above target			
Any unexpected / sudden change in milk fat or protein content?	On or above target			
Is BCS increasing, decreasing or being maintained	Cows should not lose more than 0.75 of a condition score between calving (BCS 3.5) and joining (BCS 2.75). Aim is to dry cows off and calve them in BCS 3.5			
COW SIGNS				
General cow appearance and health	Cows appear healthy, bright and alert, shiny coats. Rise easily from lying down, have good appetite (if grazing, they mix with others). General cow health? Incidence of mastitis, metabolic diseases?			
Cow behaviour	Cows are quiet and content			
First calvers - size	Are the first calvers at least 85% of mature liveweight?			
First calvers – demeanour	Are the first calvers settled into the herd and competing well with mature cows. Are they in good condition?			
Condition score	No cows less than BCS 2.5 or more than BCS 4. Cows are managed to dry off at BCS 3.5.			
Rumination	At least 50% of cows at rest (i.e. not feeding) are ruminating			
Rumen fill	Average rumen fill score for lactating cows should be 3. Dry cows may be 3 to 4			
Manure consistency	Average manure score should be 3. May range from 2 to 4			
Manure characteristics	Little long fibre or undigested grain present			
Locomotion score	Few lame cows present.			
FEED SIGNS (incl. PASTURE SIGNS if grazing)				
Fresh feed supplies	Empty feed troughs often indicates cows that are hungry. Do cows always have fresh feed available? Are feed troughs cleaned daily?			
Feed refusals	What is the amount and condition of feed refusals just before the next supply of fresh feed is supplied?			
Pasture grazing (need to observe the last paddock the cows grazed)	Are cows grazing too lax or too hard? Observe manure clumps (cows graze fairly close to manure heaps, but not right into them)			
Urine & excess protein?	Little evidence of ammonia smell from urine in cow shed and/or urine burns in grazed paddocks			

Become a Rumen8 detective

Look for **Cow signals**

- General appearance
- Condition score
- Rumination & rumen fill
- What is in the feed trough (or not....)
- Manure & urine
- Posture & lameness
- Milk composition (if available)

Look for **Feed signals**

- Feed quality incl. appearance, smell
- Conserved forages
  - Appearance, smell, mould?
- Concentrates
  - Appearance, smell, processing
- Pasture & fodder crop quality
- Pasture residuals (grazing)
- Don't forget: water is the 'first feed'

Assemble a "Body of Evidence"

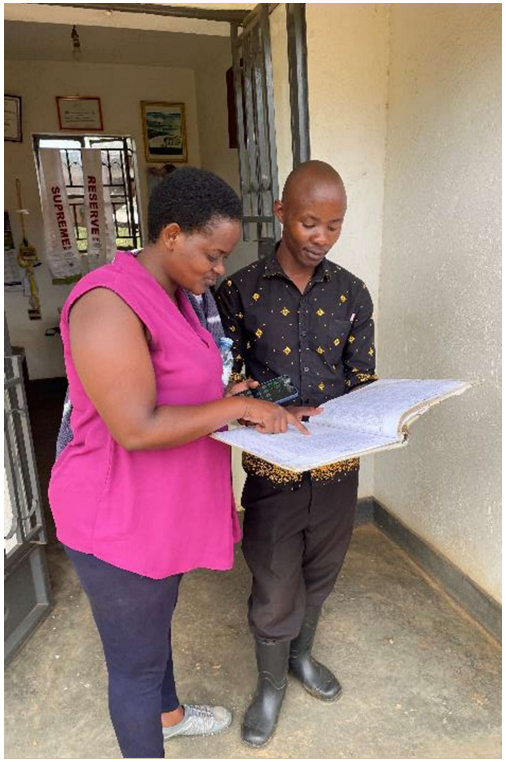
General farm & feed data to collect

- Farm land area used for dairy
  - Areas for each type of pasture and crops grown
  - Any other land available that could be used for dairy?
- Conserved forages
  - Types and quantities available
  - Bale sizes/weights
  - Quality, smell, management of conserved feeds (e.g. silage management)
- Grazing - state of pastures
  - Pasture species, stage of growth at grazing, grazing intensity (pasture residuals), weeds
- Any other feed sources available on-farm and at what cost?
- Drinking water availability and quality
- State of farm buildings incl. cow shed, milking shed, feed storage etc.

Additional animal data to collect

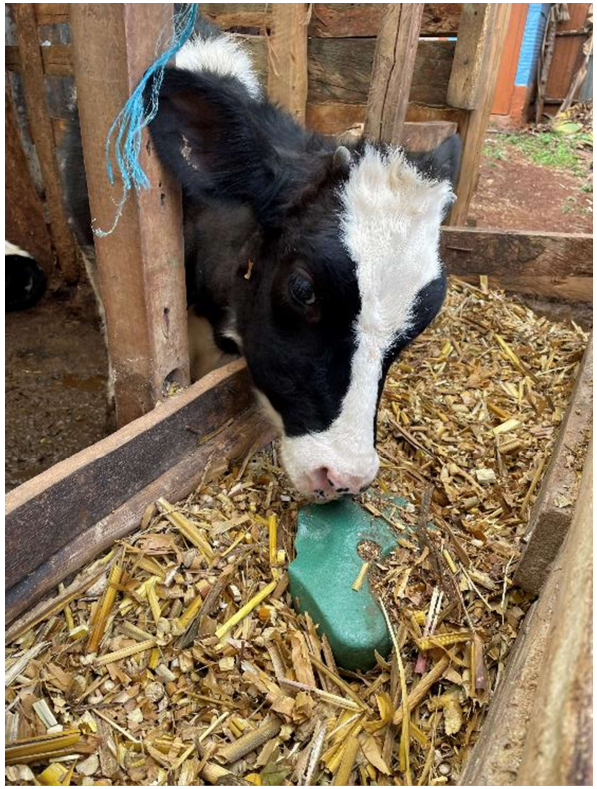
Data for each group of animals to be assessed

- Number of animals
- Class of animals (milkers, dry cows, young stock, etc.)
- Animal breed/cross
- Typical cow weights & body condition scores
- Milk yields - average for the past week
  - Milk composition if available
  - Milk price per litre (or kg)!
- Group averages for days in milk and pregnancy status
- Housed or grazing? (with distance/terrain walked if applicable)
- Are young stock meeting LW and size targets given their age?
- Cow comfort: cool shade, comfort for lying down etc.



Daily feeding information to collect

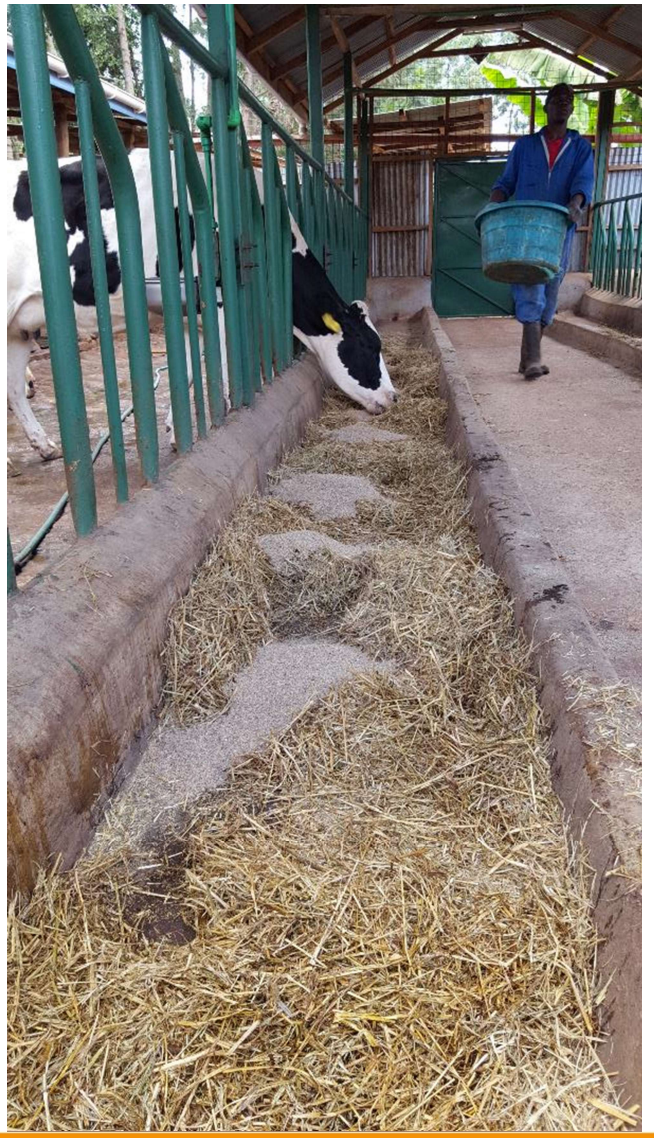
- Amounts offered / animal / day for all feeds
- Estimate of feed wastage
- Your assessment of feed quality
  - In particular DM, ME, CP, NDF, starch
  - Pasture, forages, conserved forages, concentrates
  - Are any feed analyses available?
- Actual costs for all feeds



The ‘Art of Feeding’ 1/3

- One important aspect of feeding is **not** covered by Rumen8
- The **‘art’ of feeding’** is important!!
- A ‘properly formulated diet’ can still be a health hazard!
- Consider this photo

– what do you make of it?



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The ‘Art of Feeding’ 2/3

Sub Acute Ruminal Acidosis (SARA)

- Symptoms: Cow off feed, loss of body condition, drop in milk yield & milk fat %, diarrhoea, reddening of coronary band
- Implement corrective measures, esp. in warm weather (>20°C) when temperate dairy breeds reduce roughage intake to reduce their metabolic heat production
- Spread concentrate feeding out over the day, mix concentrates well with roughages; lower total concentrate amount, reduce starch, increase amount of high-quality forage (e.g. lucerne hay) to stimulate saliva production = increase rumen pH

The ‘Art of Feeding’ 3/3

The best feeding trough is no feeding trough

Key points

- Farm walk is **essential**
- Be a “Rumen8 detective” – what do you see?
- Feeds can tell us a lot & cows don’t lie!
- Use routine observation of cow appearance, behaviour and milk production to support feeding decisions
- Build a “Body of Evidence” from all your observations

Q & A
Discussion

Part 5C
Some other factors to consider

Don’t believe in fairy tales & fufu dust!

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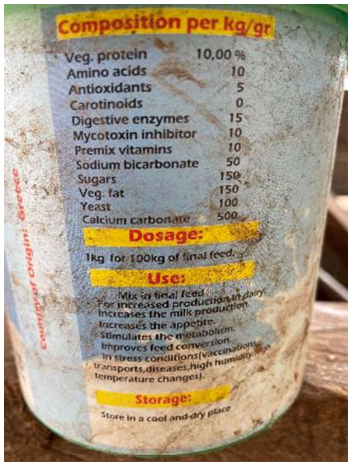
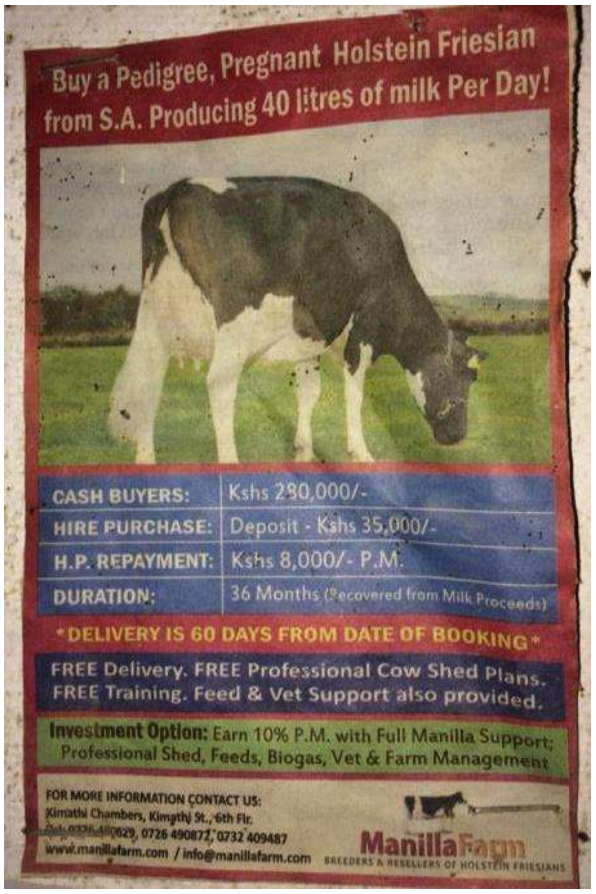
Daily Nation 20 April 2016: Farmers lose millions in cow import fraud.

At least 140 people say they have lost their hard-earned cash to a firm purporting to sell cows imported from South Africa producing 40 L of milk per day.





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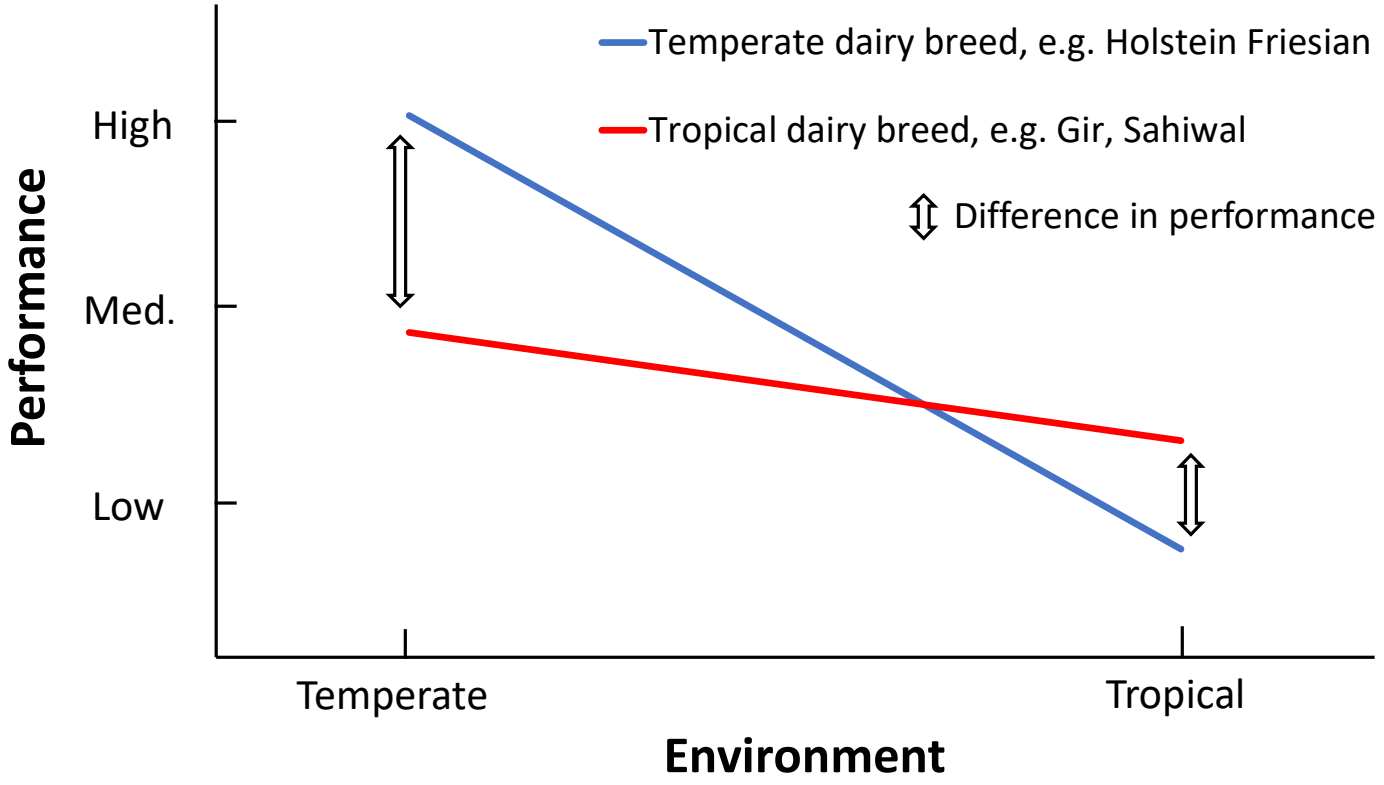
Breeding aims

- Are Holstein cows/semen the solution to low milk production?
- Rather than aiming for high milk yields (& black and white colour), breed for traits such as:
  - Resilience; Longevity
  - Ease of calving and high fertility
  - Good converters of roughage
  - Maintaining high intake at high temperatures (>20°C) and humidity
  - Lower mature body weight lowers ME needed for maintenance
  - Low susceptibility to diseases: mastitis, parasites

Genotype by environment interaction

Temperate breed *e.g.* Holstein

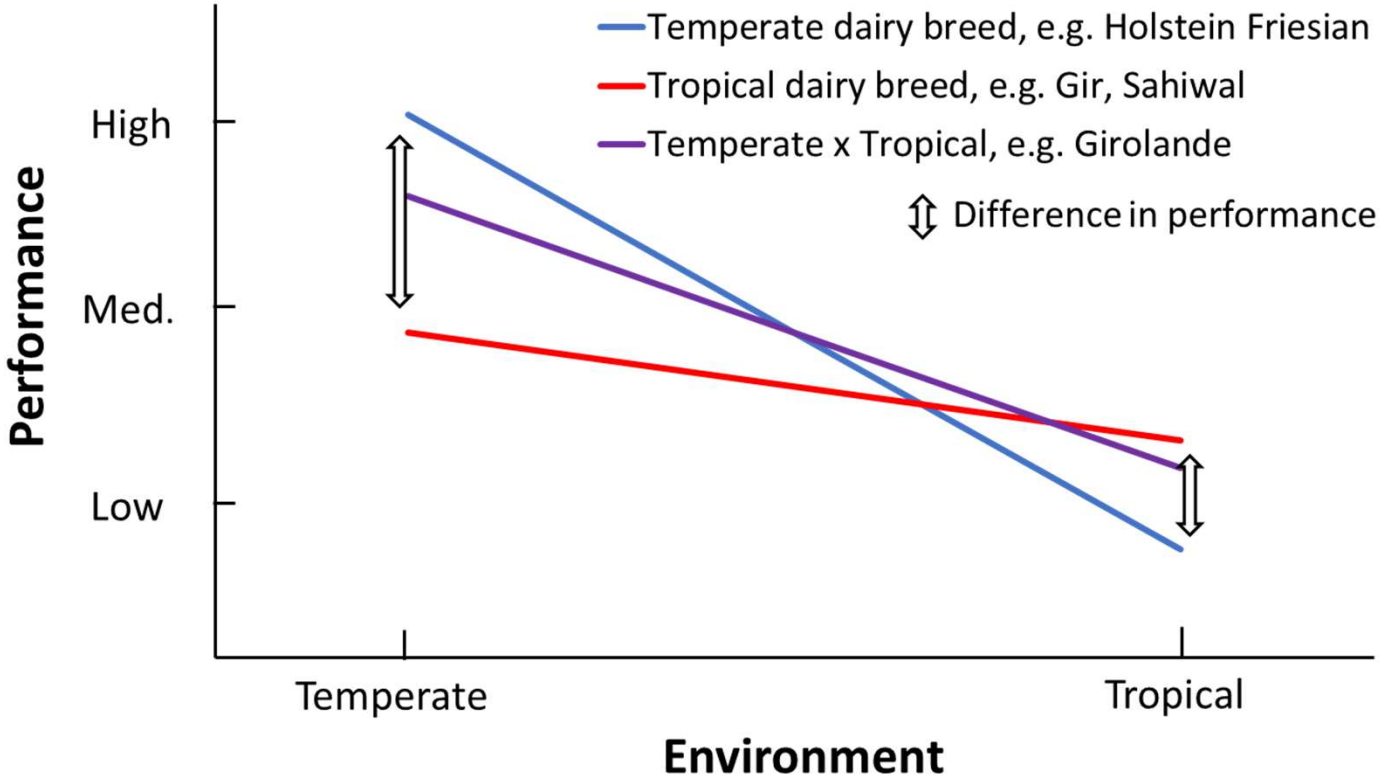
Tropical breeds: *e.g.* Gir



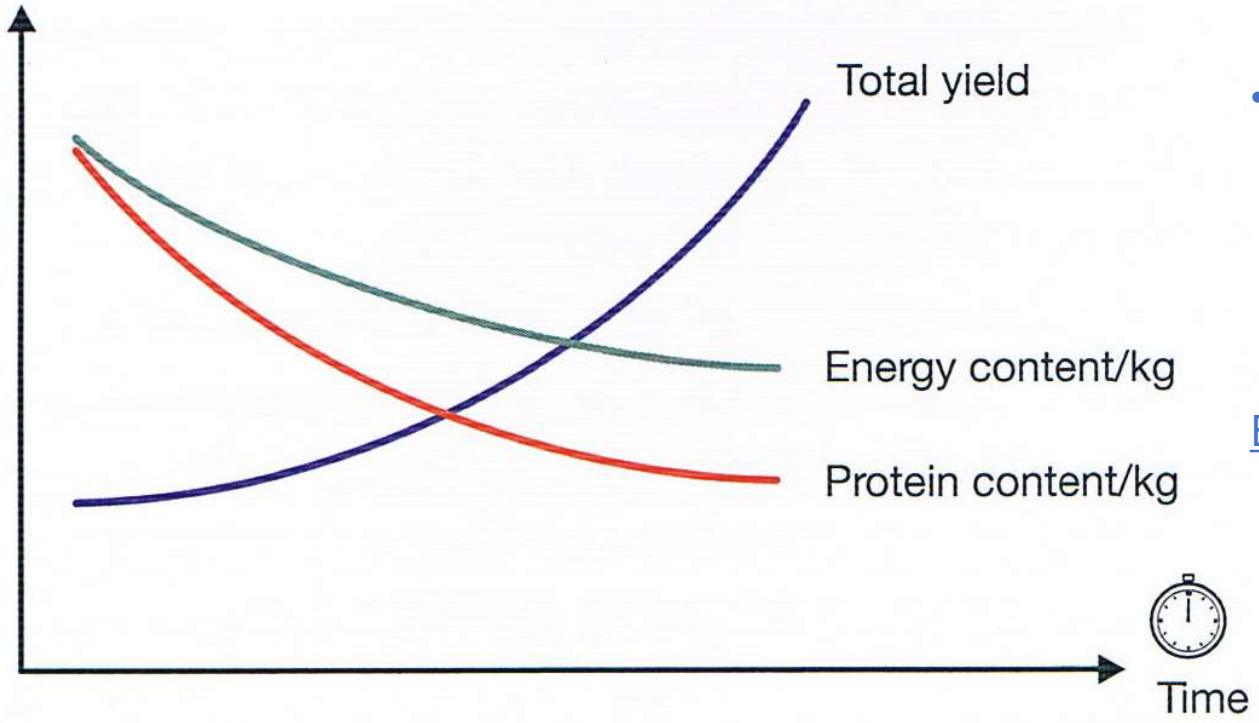
Genotype by environment interaction

Girolande: 5/8th HF, 3/8th Gir

Holstein Brahman cross



Drop in grass quality over time



- MJ ME and CP/kg DM drop as grasses mature
- Conflicting interests:
  - Vendor wants high yield/ha and produces low quality hay.
  - Buyer wants high quality hay and consequently yield/ha drops, though more cuts per year.

<u>Be fair to all:</u>

- Pay per MJ ME
- Price/kg for poor hay will drop
- Price/kg for good hay will rise
- Good hay will become a feedstuff worth including in the diet

Take home messages

- Diet formulation software (e.g. Rumen8) only useful when integrated in broader “farm coaching programme”
  - Essential to balance total diet, with special attention to forages
  - Feed analysis will increase accuracy of diet formulation
  - Sound knowledge of dairy cow nutrition is needed
  - Truthful farm records are indispensable

- It is fair to all parties to trade feeds on the basis of their nutritive value (KES/MJ ME & KES/kg CP)

- Adapt the cow to the environment (=breed selection) or adapt the environment to the cow (=feed quality, housing, disease prevention etc.) to build resilient profitable dairy farms

Q & A Discussion

Part 5D
After the farm walk - How to apply Rumen8

After the farm walk

- Sit down with farm manager/owner so he/she can be part of process
  - See this as a learning opportunity for the farm manager, as well as yourself
  - Make sure you have agreement with farmer/manager about the data you collected
- Start by setting up the 'current farm reality' in Rumen8
  - Enter all required animal data for each group of interest
  - Select feeds from library most similar to feeds available on farm
  - Make a copy of feeds and edit feed values to fit your best estimate of 'reality'
  - Compare Rumen8 predicted feed intake with actual feed intake (both intake methods)
  - Enter actual feed & milk prices
- Do they match?
  - Do the 'Actual farm' and the 'Rumen8 farm' match?
  - **If not, re-assess and adjust Rumen8 till it describes the reality of the farm**

What can be done better?

- Store the ‘current farm’ in slot 1 on Compare tab
- Now start to assess the merits/deficits of the current diet
  - Start with quick overview on ‘Diet’ tab – “any major issues”?
  - Then look at details on the ‘Diet detail’ tab
- Can the diet be improved with feeds available on farm?
  - Are nutritional improvements required/possible?
  - Can the cost effectiveness of the diet be improved?
- Any opportunities to use feeds not currently fed but potentially available?
- Store most promising diet improvements in slots 2 & 3 on Compare tab
- Involve farm owner or manager in this process!
- Discuss findings with farm owner or manager to agree on recommendations

Also .....

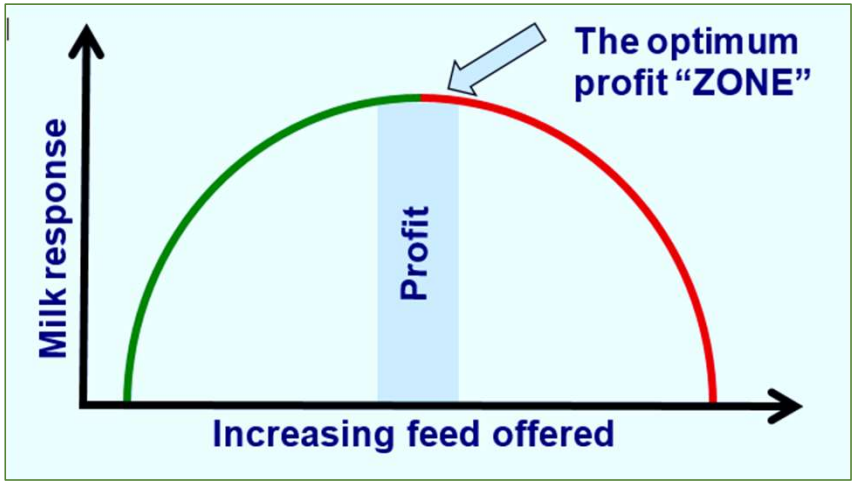
- Use your farm visits to raise the following topics
  - Nutrition of young stock
  - Nutrition of dry & transition cows
  - Both are key parts of preparing cows for profitable lactations!

Money money money!

- Ultimately **profitability** is always the final decider!
- A nutritionally perfect diet may send your farmer client broke!
- Find the right balance between nutritional perfection and ‘margin above feed cost’
- Provide the farm owner/manager with realistic options where possible (rather than rigid prescriptions)

Be realistic!

- Be realistic about the change in milk yield or financial margin that can be achieved
  - Remember the law of **diminishing returns**
  - More feed doesn't always lead to more profit!



How to go from “A to B”

- “A” = current feeding practice on farm
- “B” = new agreed improved feeding practice
- How do we go from “A to B”?
  - How do we get there? How do we make the change?
  - Develop a ‘travel plan’ to go from “A to B”
- Be cautious!
  - **Gradual** dietary changes are important for dairy cows!
  - Change diet by only 1 kg DM per day
  - It will take a week or two to make major dietary changes
  - Develop a clear plan to **gradually change** from “A” to “B”
  - Agree with the farmer on how to implement the plan

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Course Goal

- To improve knowledge and skills of trainees so that they can confidently use the Rumen8 software application to make informed on-farm nutrition decisions to improve farm profit.
- Rumen8 is our **tool** to help in our decision making
- Let's get started!

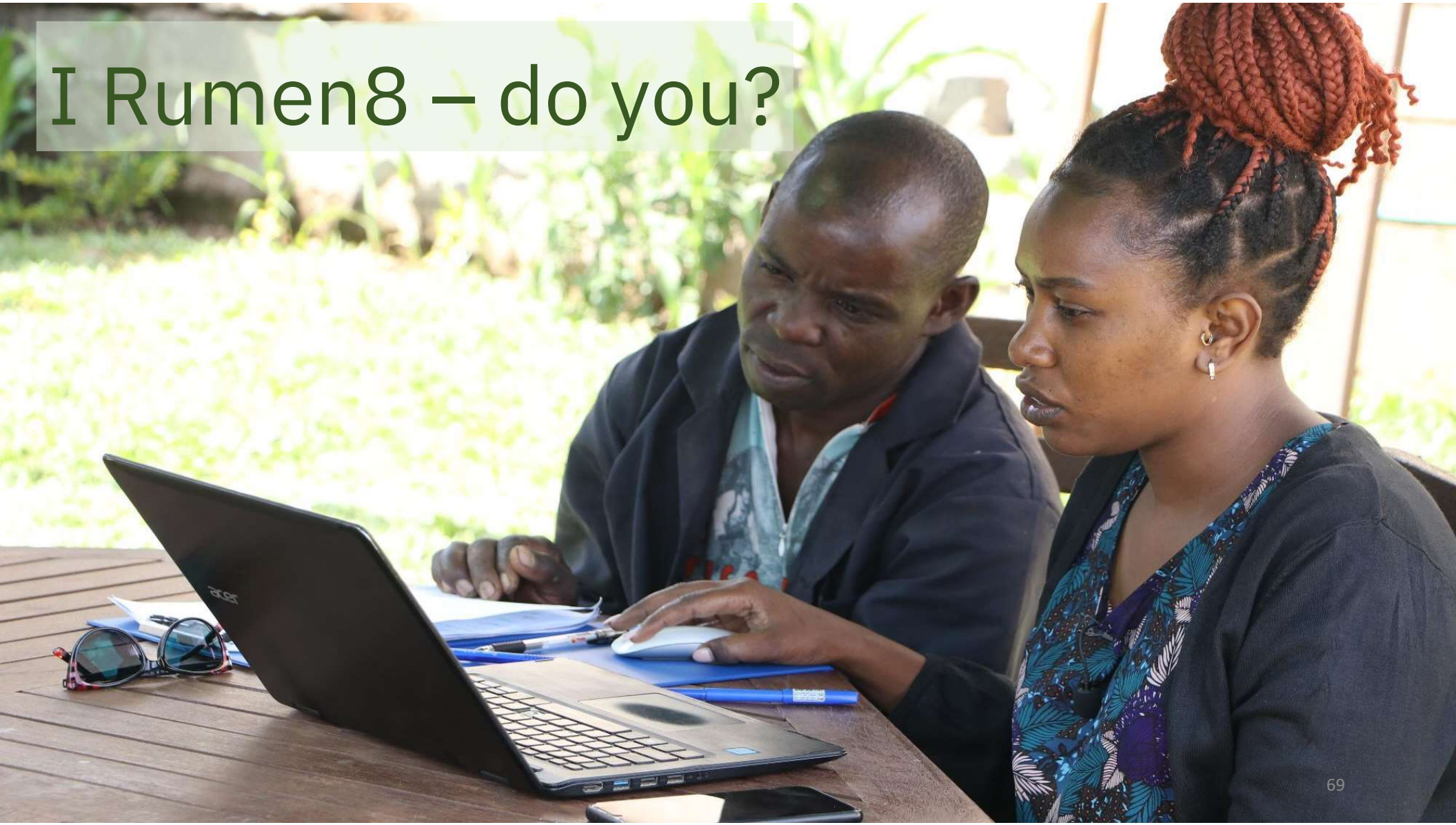
Use of Rumen8 after the farm walk

- Set up the current farm reality in Rumen8
- Explore strengths and weaknesses of current feeding program
- List the opportunities for improvement
- Come up with a best-bet plan to improve farm profit
- Discuss with farm manager
- Once agreement is reached, come up with an “A to B” plan
- Provide manager with clear recommendations
- Revisit farm after 1 and 2 months to monitor progress and fine-tune

Practice makes Perfect!

- It will take time to master the skills needed for a successful farm walk
- It will take time and perseverance to master the use of Rumen8
- Work with an experienced ‘Rumen8 coach’ to learn the ‘**Science & Art of Feeding**’
- This course is only a first step in that process

I Rumen8 – do you?



Q & A Discussion

Part 5E
Exercise 5-1
Applying Rumen8 at host farm

Exercise 5-1

- Practical ‘real life’ application of Rumen8 at host farm
- This is a group session – all trainees to contribute
- Allow up to 3 hrs for this session
- You know what to do – so let’s do it

Use of Rumen8 after the farm walk

- Start with Rumen8 after farm walk
- First set up ‘current farm situation’
- Animals, feeds (amount & quality), feed & milk prices
- Does it make sense? If not, re-assess.
- Only proceed if ‘current farm’ and ‘Rumen8 farm’ ‘match’
- Capture ‘current farm’ in ‘Compare’
- Assess merits/deficits of current diet

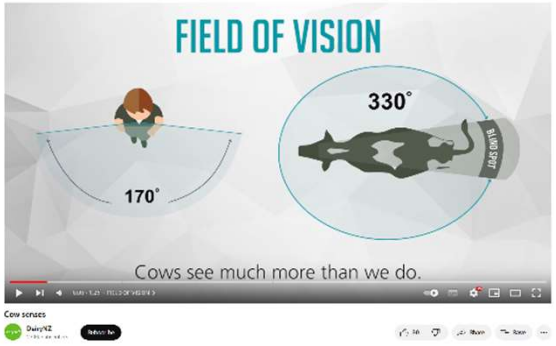
- Look at ‘Diet’ & ‘Diet detail’ tabs – what does it tell us?
- Can diet be improved with feeds available on farm?
  - Nutritionally & financially
- Is there a possible financial benefit from feeds currently not on farm?
- Store promising alternative diets in Compare
- Together with farmer discuss findings
- Conclude with recommendation and provide a clear plan for changing “from A to B”
- Agree on follow up visits to monitor progress


Q & A
Discussion

Introduction to Part SIX

- Part SIX of this course consists of eight case studies of farm scenarios that will be evaluated with Rumen8
- This can be conducted on farm or in a class room setting
- Individual laptops are essential
- Discussion is essential!
- ‘Practice makes perfect’

HOME WORK – three more videos to watch



https://youtu.be/Z_GcsTPRRBw

https://youtu.be/kieKaRZWQis

https://youtu.be/OO86D_z_7bM

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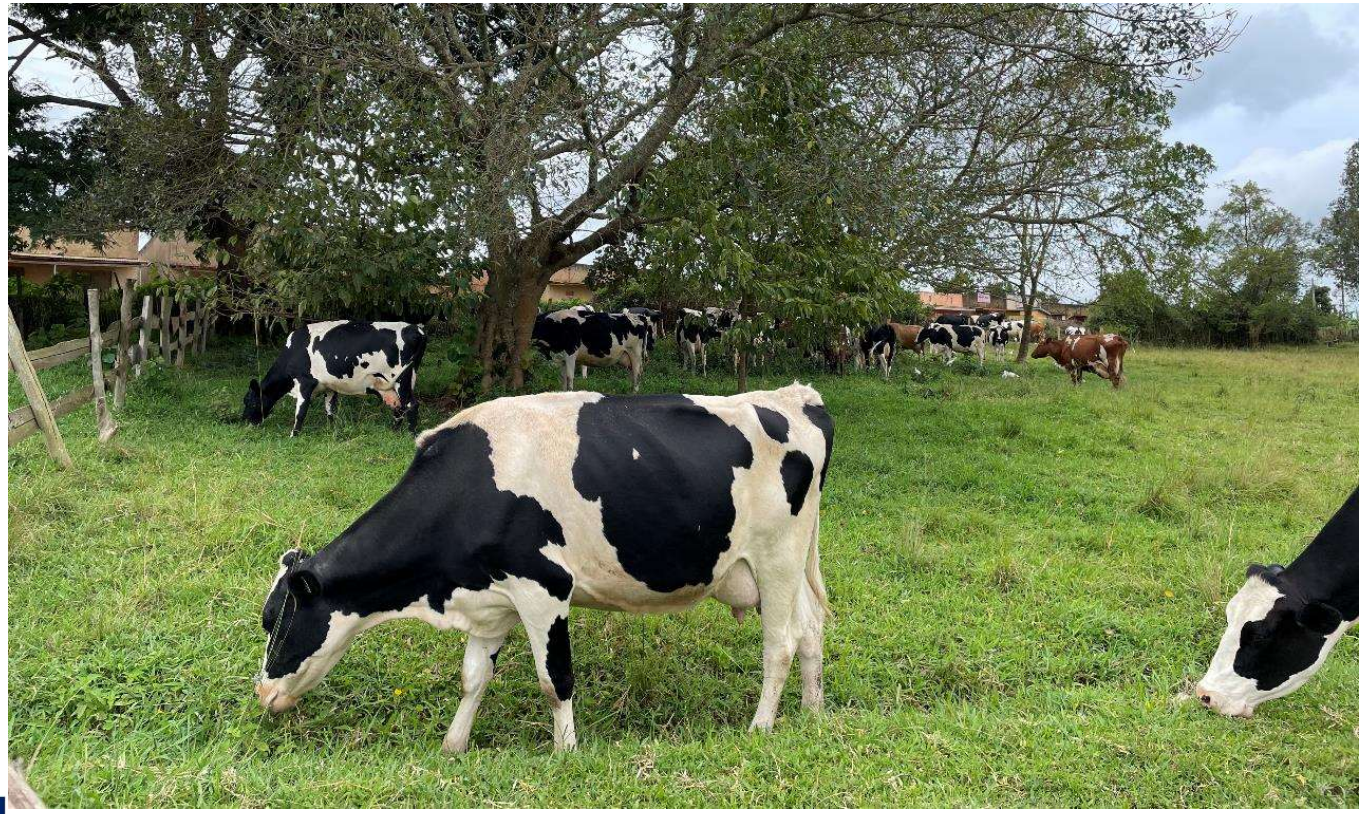
Dairy cattle nutrition in the tropics using Rumen8



Part FIVE finished