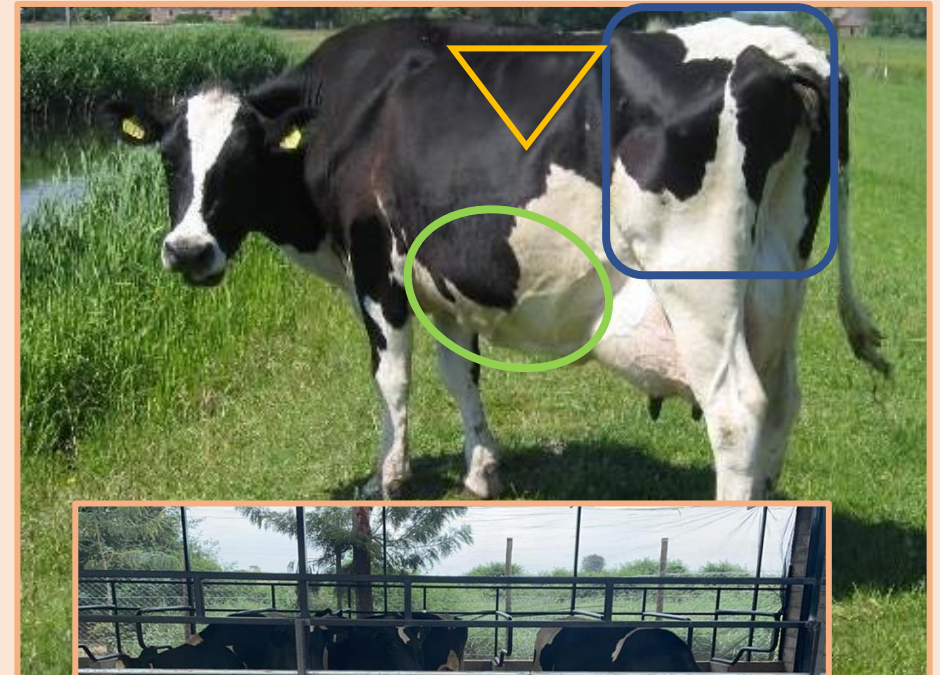


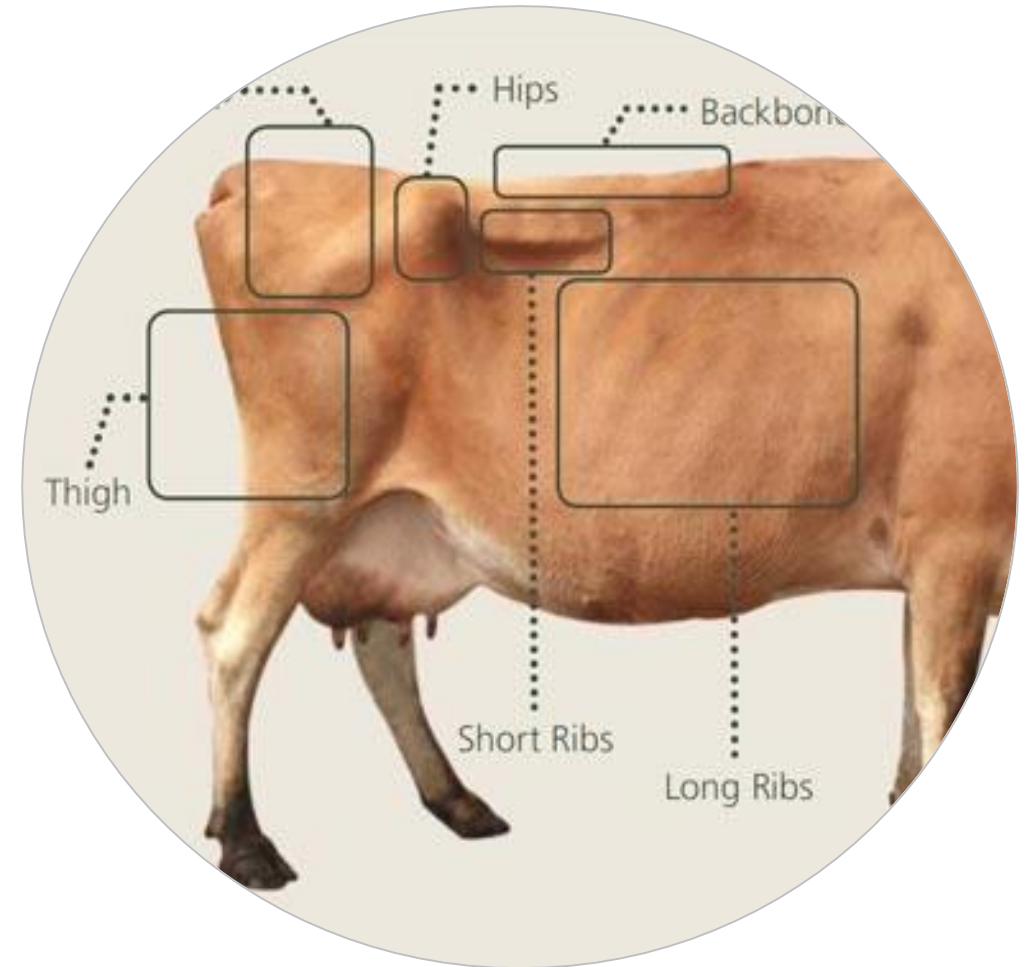
# REVIEWING FEED INTAKE, RUMEN FILL, BODY CONDITION SCORING (BCS) (Level 3)

| Topic | Training & information Content  |
|-------|---|
| 3.1   | Estimating feeding value of fodder & feed on dairy farms                                      |
| 3.2   | Sampling feeds & forages/analysis interpretation  |
| 3.3   | Estimating Dry Matter intake for various breeds/age categories of dairy cattle in the tropics |
| 3.4   | Reviewing feed intake, rumen fill, Body Condition Scoring (BCS)                               |
| 3.5   | Life weight estimation of cows  |
| 3.6   | Rumen fermentation  |
| 3.7   | Mineral & vitamin requirement, guidelines   |
| 3.8   | Manure scoring and evaluation   |
| 3.9   | Guidelines for ration calculations for various breeds, heifers, lactation stage (Rumen8)      |
| 3.10  | Use of Rumen8 software for ration calculation   |
| 3.11  | Optimization of ration with Rumen8  |
| 3.12  | Feeding management guidelines   |
| 3.13  | Feeding management of dry cows/close up   |
| 3.14  | Feeding systems   |
| 3.15  | Metabolic disorders   |
| 3.16  | Scoring locomotion and hoof condition   |
| 3.17  | Mycotoxin in dairy cattle nutrition   |
| 3.18  | Heat stress in dairy cattle nutrition   |
| 3.19  | Monitoring feeding management, using KPIs (based on Rumen8)                                   |



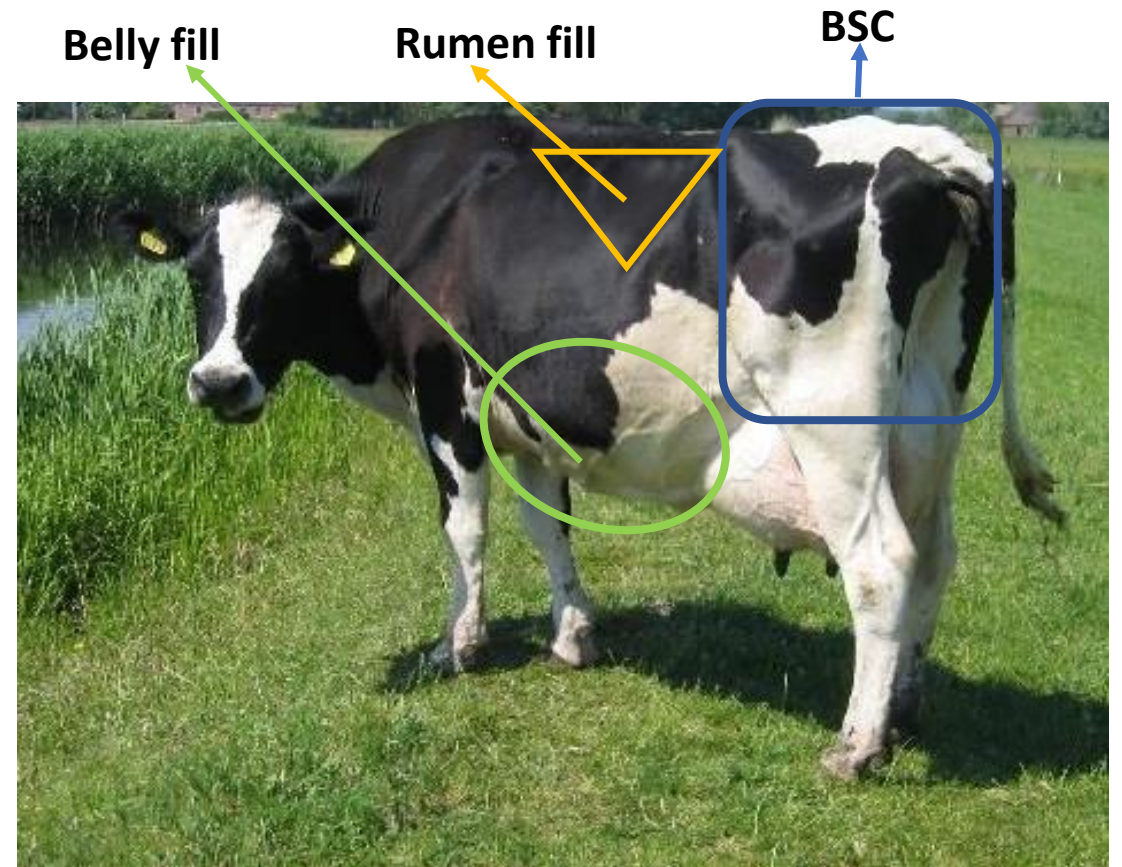
## 1. You will learn about (learning objectives):

- Rumen fill and factors affecting rumen fill.
- Body condition score (BCS) and how to assess cows for scoring.
- Feed intake in relation to rumen fill and body condition score.



## 2. Background

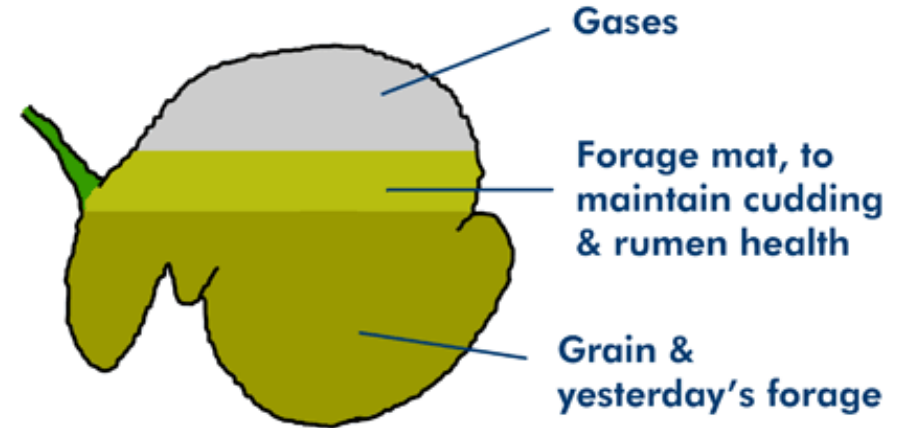
- The amount of feed a cow consumes per day is known as feed intake and can be assessed in several ways.
- Rumen fill, belly fill and body condition score can tell you how much feed and nutrients a cow has eaten.
  - Rumen fill is the total amount of liquid and dry matter in the rumen on a daily basis.
  - Belly fill score is the amount of feed intake in less than a week and can drop dramatically in two days.
  - Body condition scoring (BCS) is a technique for assessing the condition of livestock at regular intervals and can be effected from one week onwards.



## 2.1 Background Cont'd...

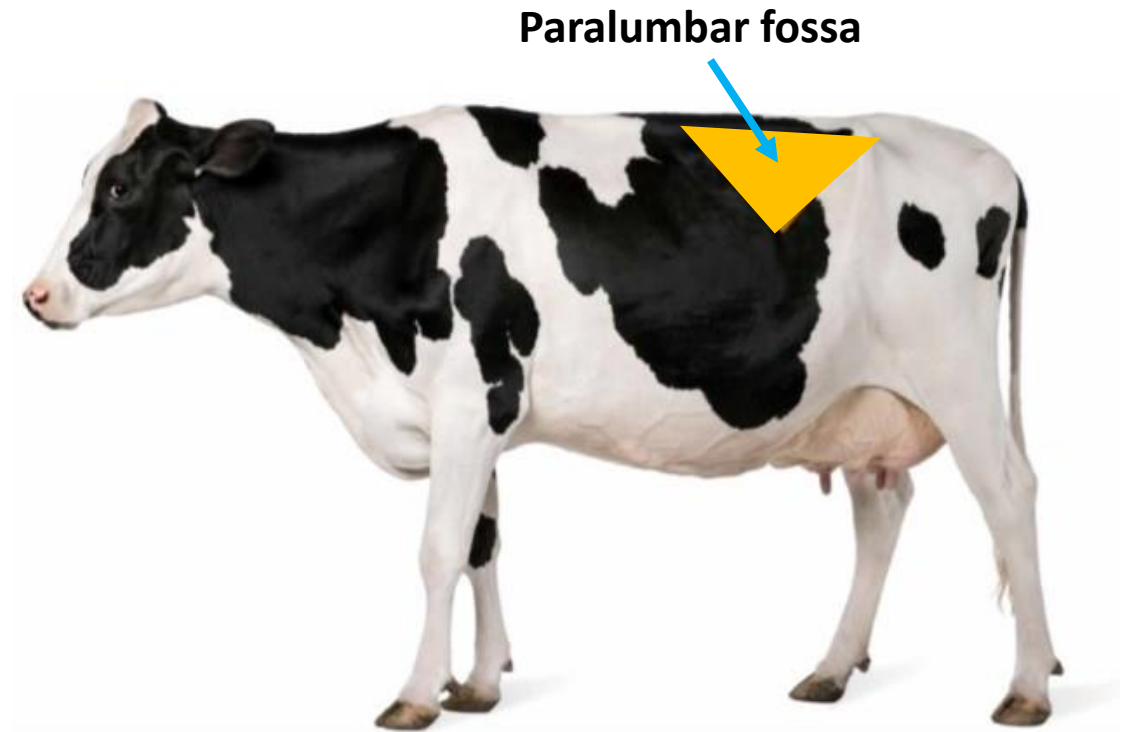
- Dry matter intake (DMI) is the amount of feed a cow consumes on a moisture-free basis.
- Rumen fill is related to DMI, ration composition, digestibility and the rate of passage of ingested feed.
- The purpose of body condition scoring and rumen fill is to achieve a balance between feed cost, milk production and animal health.

## The Rumen



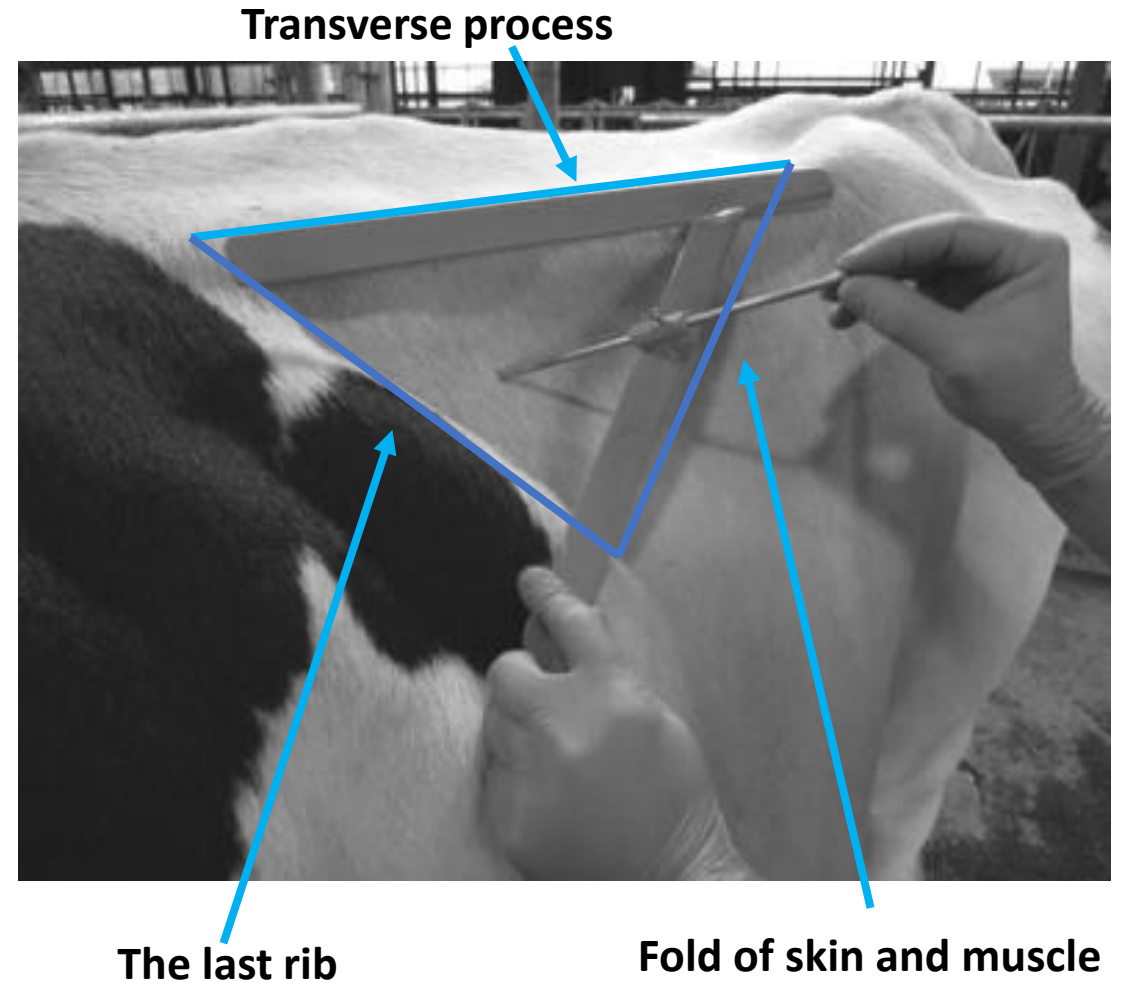
### 3. Rumen fill

- The rumen takes up the majority of the left side of the abdomen of ruminants.
- Rumen fill scores can only be evaluated from the left hand side in the paralumbar fossa.
- The area to assess is the color orange triangle shown in the diagram.



## 4. Position of Rumen fill scoring

- The boundaries are behind the last rib, beneath the transverse process of the spine (sometimes called the 'short ribs') and in front of a fold of skin and muscle which runs down from the hook bone.
- When rumen fill is poor, this area is hollow/concave - often described as the "danger triangle". This signals that the rumen is empty, and the cow has not been eating as much as she should on a daily basis.

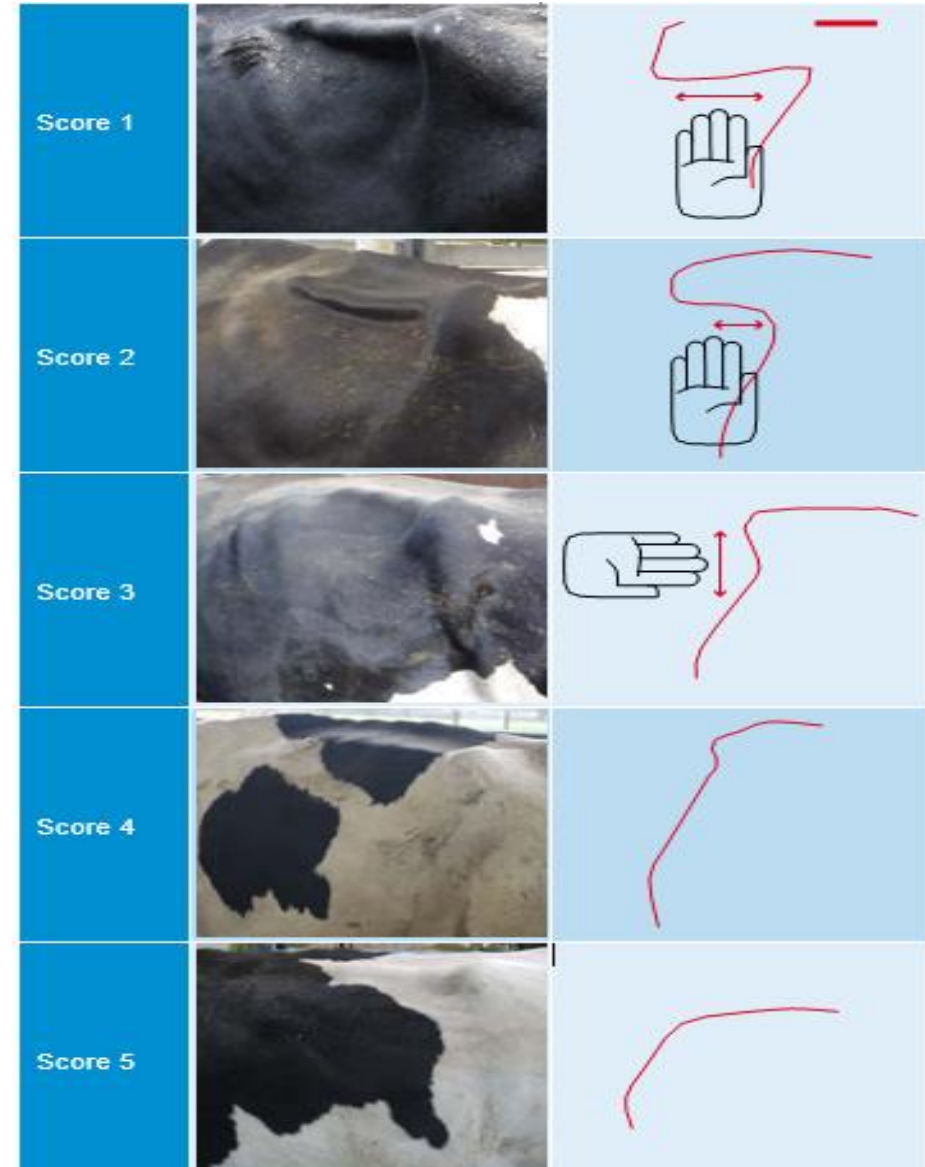


## 5. Rumen fill score assessment

- The rumen score provides a good measure of the cow's nutritional status on a daily basis using a five point system assessing rumen fill.

Rumen fill is scored on a five point scale:  
1 = very poor rumen fill to 5= full rumen.

- It is useful to carry out scoring at different times in the day to get a better representation.
- Variation in rumen fill scores throughout the day should not deviate more than +/- 0.5 score from the target.



## 6. Rumen fill assessment: Score 1

- Dip deep in the left flank, more than one hand width after last rib.
- Large depth when dipping is observed.
- Skin fold from hook bone falls vertically, so hollow shape looks rectangular.
- This shows the cow has eaten nothing in the last 24 hours.



Score **1**



## 7. Rumen fill assessment: Score 2

- Dip in left flank after last rib with one hand deep.
- Skin fold from hook bone runs diagonally, so hollow shape looks like a triangle.
- Not unusual in first week after calving, but after that it signifies a problem - too little feed intake.



Score **2**

## 8. Rumen fill assessment: Score 3

- Slight dip visible in left flank, after last rib.
- Skin fold from hook bone is hardly visible.
- This is the desired score for milking cows having sufficient feed intakes.



Score **3**

## 9. Rumen fill assessment: Score 4

- No dip is visible in left flank, after last rib.
- Skin fold from hook bone is not visible.
- This is the correct score for milking cows at the end of lactation and through the dry period.
- It is the target minimum score for pre-calvers.



Score **4**

## 10. Rumen fill assessment: Score 5

- Skin is flat or slightly bulging on the left flank, after last rib.
- The skin over the whole belly is quite tight, and there is no visible transition between the flank and the ribs.
- This score is often seen in pregnant dry cows and cows on a ration with a very high fiber content.



Score **5**

## 11. Rumen fill in relation with feed intake

- Assessing rumen fill is a useful management tool to evaluate;
  - Dry matter intake (DMI), recent appetite and give an indication about the rate of feed passage through the digestive tract.
  - Ration fed: Depending on the ration being fed, there are different targets for rumen fill scores. Rations that have a slower rate of passage have higher rumen fill scores, compared to rations that have a faster rate of passage.



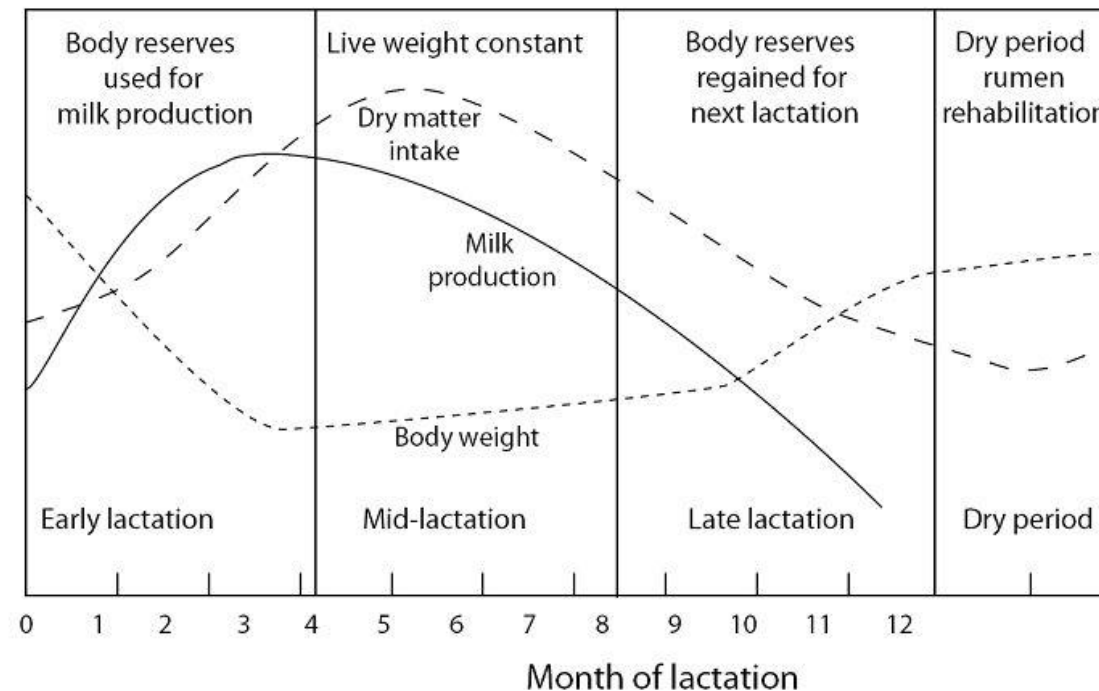
## 12. Rumen fill in relation with Dry matter intake (DMI)

- The Rumen fill is defined as the total amount of liquid/moisture and dry matter in the rumen.
- Rumen fill constitutes of previous fed feeds, recent feeds, water and gases produced.
- Rumen being filled doesn't mean dry matter requirement has been met.
- Understanding the DMI requirement of a specific cow will help a farmer to formulate a ration that will aid in the acceptable rumen fill.



## 13. Rumen fill in different lactation stages

- A heavily pregnant uterus and high fiber ration should lead to a higher rumen fill score for dry cows.
- Pre-calvers targets a rumen fill score is at least 4 because the pregnant uterus occupies a large space.
- The milkers' group (early and mid lactation), for any cow which is rumen fill score 2 or below indicates she is not eating well and she may be sick, lame or injured.
- Rumen fill score of 2 is common in the first week of lactation, but later in lactation a score of 2 or less indicates either poor feed intake and/or a high rate of passage.



## 14. Factors affecting Rumen fill

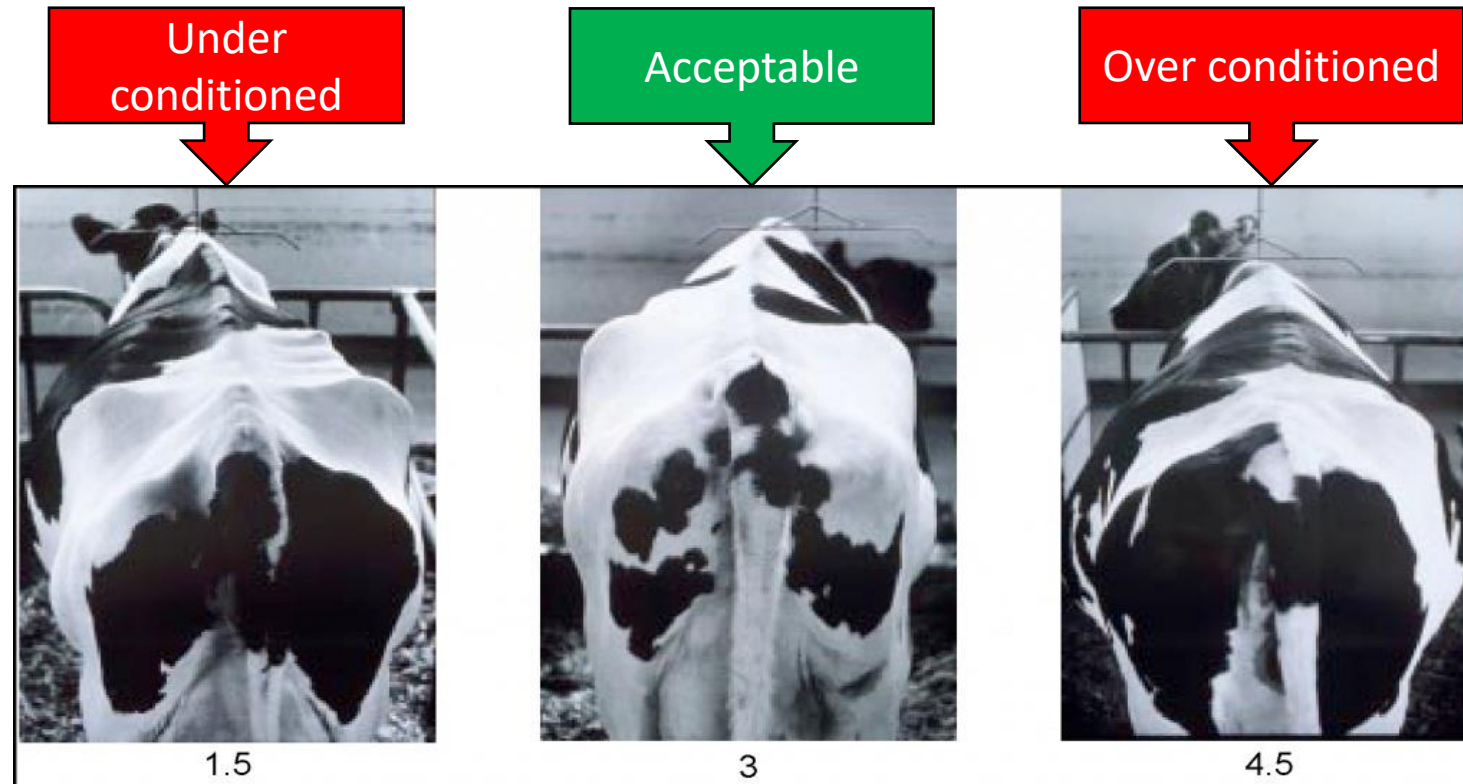
- Where individual cows have low scores, it implies need for further investigation:
  - Are they ill?
  - Are they more vulnerable, lower ranking animals getting pushed out from feed trough if feeding space is too narrow.
  - If there is a lot of variation in rumen fill scores in the herd/group, find out why.
  - If the scores in a group are too low or too high, monitor feed intake and inspect the ration.





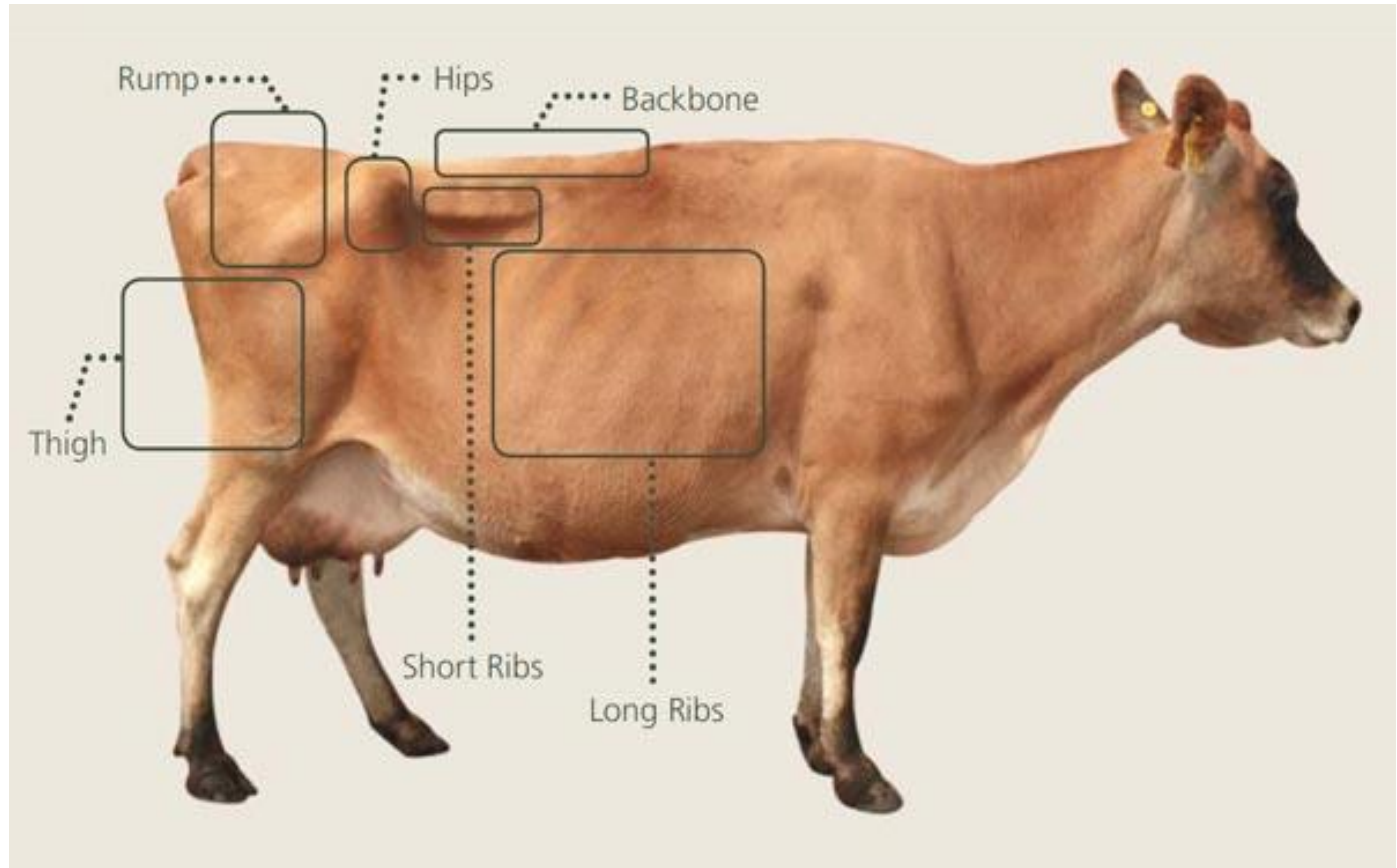
## 15. Body Condition Scores (BCS)

- BCS is the visual evaluation of the amount of muscle and fat covering the bones of an animal.
- It can be assessed independently of live weight, gut fill and pregnancy status and involves observing specific points on the animal.
- Scoring enables farmers to compare the condition of their cows with recommended targets.



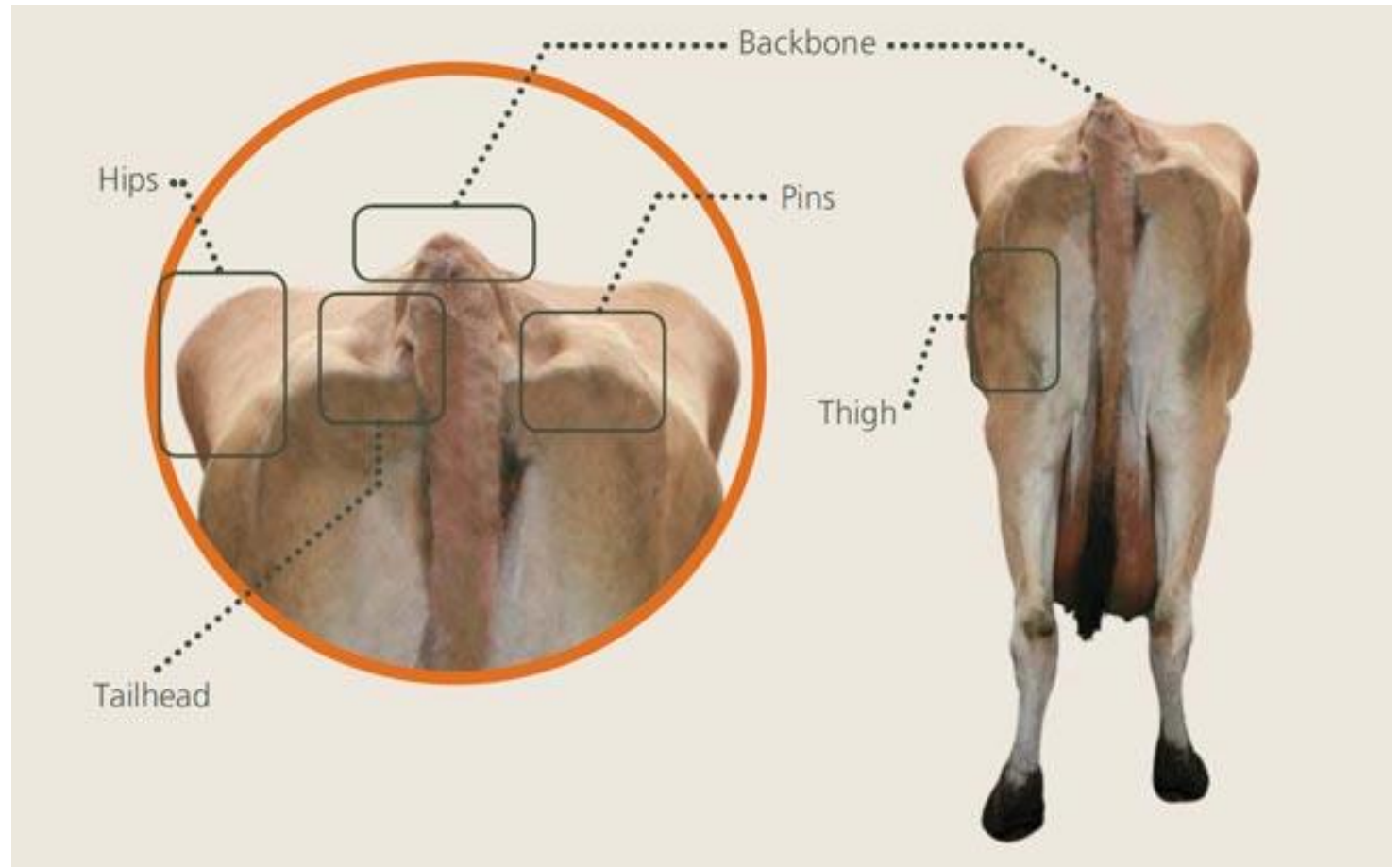
## 16. How to score Body condition

- For accurate scoring, both visual and tactile appraisals (touch the animal) are necessary.
- The following diagram illustrates the dairy cow's major bones and muscle groups and shows the areas of concern when scoring the body condition.
- The cow is judged from the side and the back/rear.
- The main parts of the side is the long and short ribs, the rump, the thigh and hip bone.


























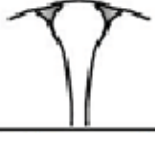

## 16.1 How to score Body condition Cont'd...

- The body condition score from the back/rear of the cow is as shown on the diagram.
- The main parts to observe are the pin bones, hips, backbone and the tail head.
- By standing at the back of the cow you can view all these parts.



## 17. Body condition score chart

- On a five-point scale, a score of 1 denotes a very thin/under conditioned cow.
- A score of 5 denotes an excessively fat/over conditioned cow.
- These two are extreme scores and should be avoided.
- The average score of 3 is the most desirable for the majority of the herd.
- A score with a plus or minus indicates a borderline body condition.

| Body Condition Score                  | Vertebrae at the middle of the back   | Rear view (cross-section) of the hook bones   | Side view of the line between the hook and pinbones                                   | Cavity between tailhead and pinbone   |   |
|---------------------------------------|---|---|---|---|---|
|                                       |   |   |   | Rear view   | Angled view   |
| 1<br>Severe underconditioning         |    |    |    |    |    |
| 2<br>Frame obvious                    |    |    |    |    |    |
| 3<br>Frame and covering well balanced |    |    |    |    |    |
| 4<br>Frame not as visible as covering |    |    |   |   |   |
| 5<br>Severe overconditioning          |  |  |  |  |  |

## 18. Body condition score 1

- Individual short ribs have a thin covering of flesh.
- Bones of the chine, loin, and rump regions are prominent.
- Hook and pin bones protrude sharply, with a very thin covering of flesh and deep depressions between bones.
- Severe depression below tail head and between pin bones.
- Bony structure protrudes sharply, and ligaments and vulva are prominent.



Score **1**

## 19. Body condition score 2

- Individual short ribs can be felt but are not prominent.
- Ends of ribs are sharp to the touch but have a thicker covering of flesh.
- Individual bones in the chine, loin, and rump regions are not visually distinct but are easily distinguished by touch.
- Hook and pin bones are prominent, but the depression between them is less severe.
- Area below tail head and between pin bones is somewhat depressed, but the bony structure has some covering of flesh.



Score 2

## 20. Body condition score 3

- Short ribs can be felt by applying slight pressure.
- Altogether, short ribs appear smooth and the overhanging shelf effect is not so noticeable.
- The backbone appears as a rounded ridge; firm pressure is necessary to feel individual bones.
- Hook and pin bones are rounded and smooth.
- Area between pin bones and around tail head appears smooth, without signs of fat deposit.

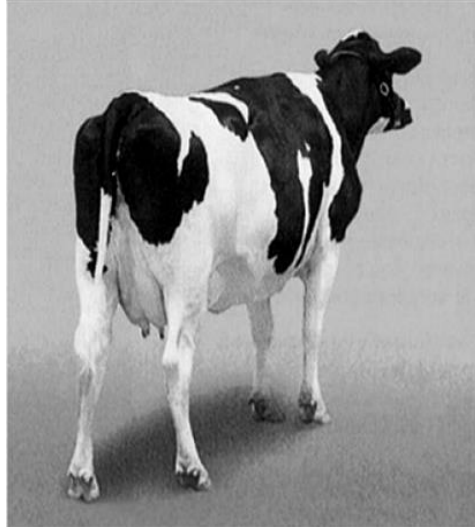


Score 3

## 21. Body condition score 4

- Individual short ribs are distinguishable only by firm palpation.
- Short ribs appear flat or rounded, with no overhanging shelf effect.
- Ridge formed by backbone in chine region is rounded and smooth.
- Loin and rump regions appear flat.
- Hooks are rounded and the span between them is flat.
- Area of tail head and pin bones is rounded, with evidence of fat deposit.

**Score 4**



**Covering has the upperhand**



Score **4**



## 22. Body condition score 5

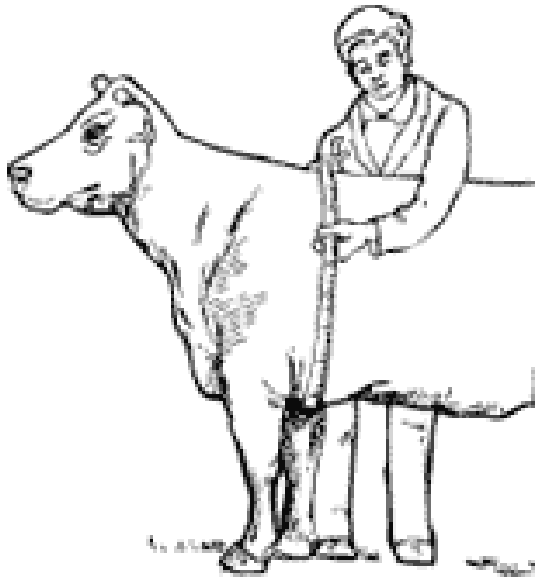
- Bony structures of backbone, short ribs, and hook and pin bones are not apparent; subcutaneous fat deposit very evident.
- Tail head appears to be buried in fatty tissue.
- The cow is considered as severely over-conditioned and this affect the general performance of the cow.



Score 5

## 23. BCS in relation to body weight

- A cow's live weight alone is not a good indicator of body reserves.
- Cows of similar weight could be small and fat, or large and thin.
- Similarly, cows could have the same body reserves and yet have very different body weights.
- Live weight is also affected by gut fill and by pregnancy.
- Body condition scoring technique can be used to quickly and reliably estimating the body reserves of COWS.



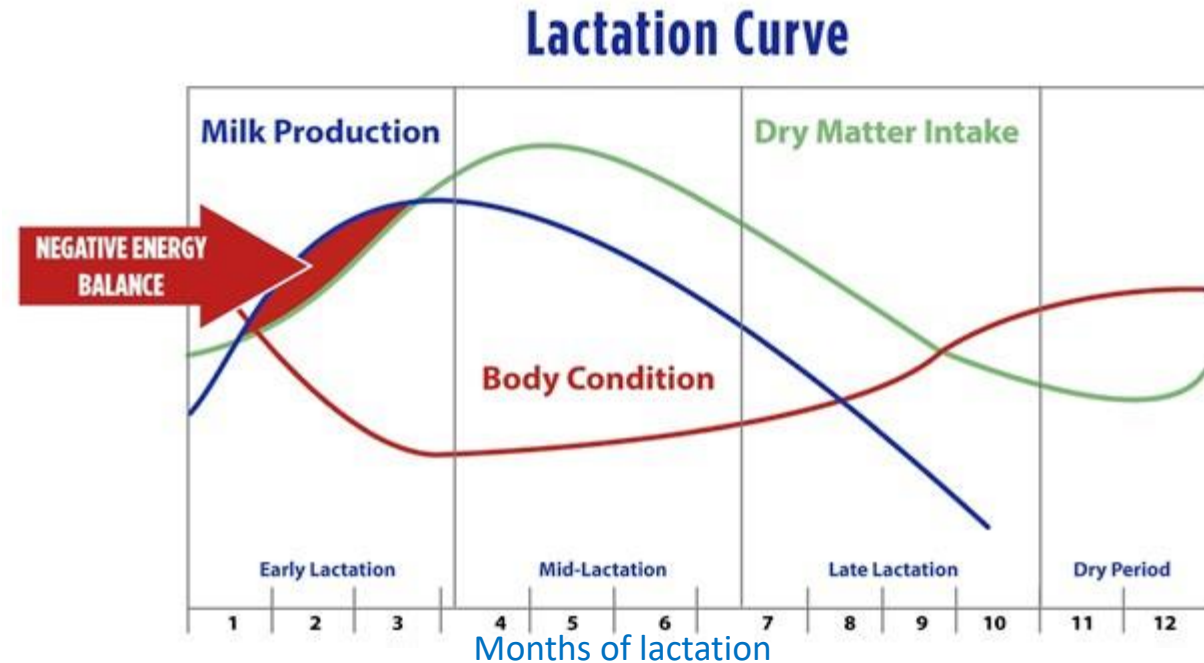
Weighing a cow using a weighing band



Weighing a cow on a weigh bridge

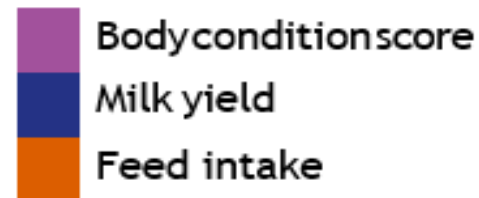
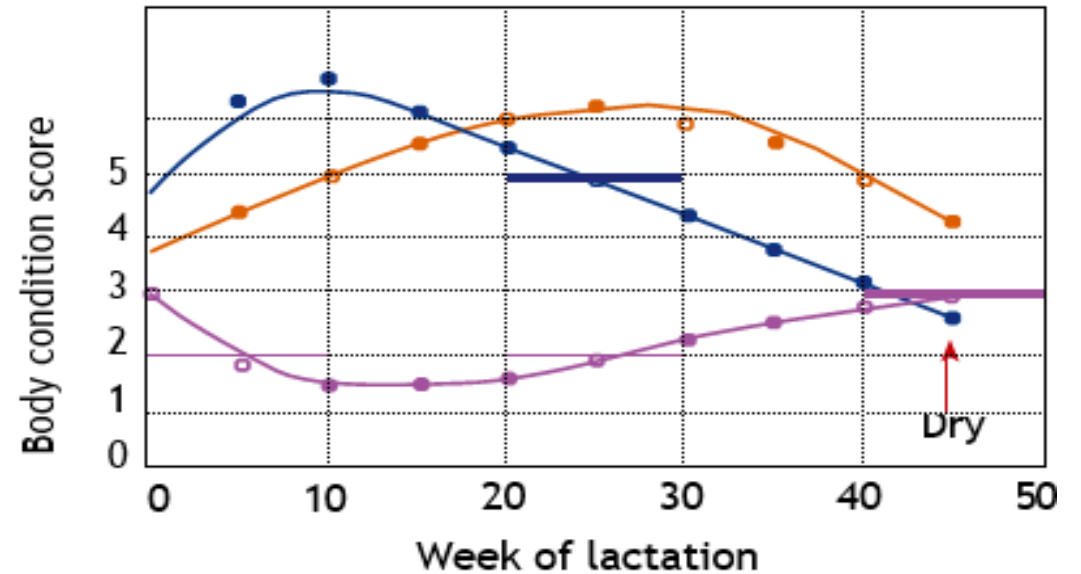
## 24. BCS in relation to feed intake

- Knowledge of BCS enables farmers to manage their feeding programs better.
- A major goal of proper feeding can be to maximize feed intake during early lactation (BCS is lowest).
- The sooner a cow reaches high levels of feed intake, the sooner she moves out of negative energy balance.
- Negative energy balance occurs when the daily energy requirement for a cow cannot be met by the energy in the diet she consumes in a day.



## 25. BCS in relation to lactation stages

- In early lactation, high potential dairy cows frequently produce far more milk than can be supported by feed intake alone.
- They do this by drawing on body reserves that were built up before calving.
- This phenomenon is where the condition score decreases due to the withdrawal of body reserves.
- This causes the cow to experience negative energy balance.

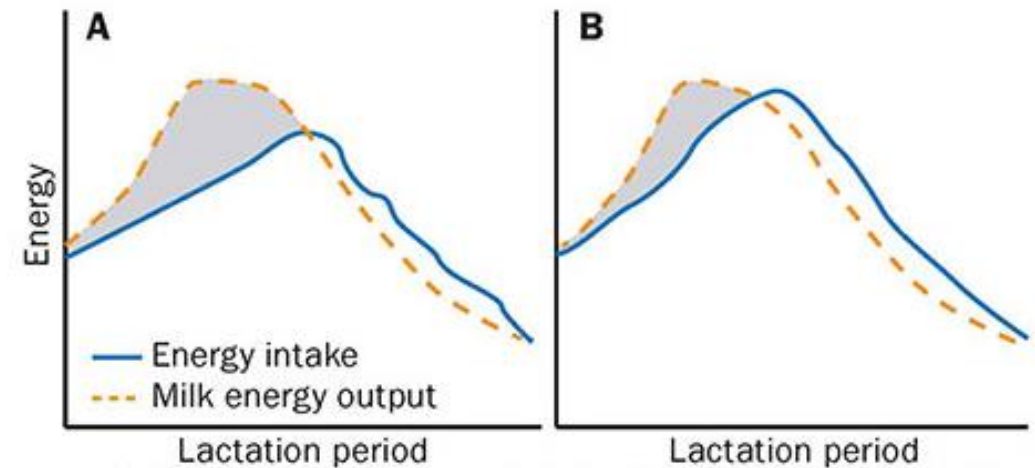


## 26. Body condition management

- Cow's body condition relates to the animal's overall performance and this can be an important tool in dairy herd management.
- In scoring a cow's body, the tail head and loin are the major areas to evaluate.
- Target scores help determine what condition to aim for during the different stages of lactation.
- If done on a regular basis, body condition scoring can improve dairy herd nutrition, health, and production.

### Severe and moderate negative energy balance, NEB.

Schematic representation of energy balance in high producing cow. The shaded areas represent severe (A) and moderate (B)



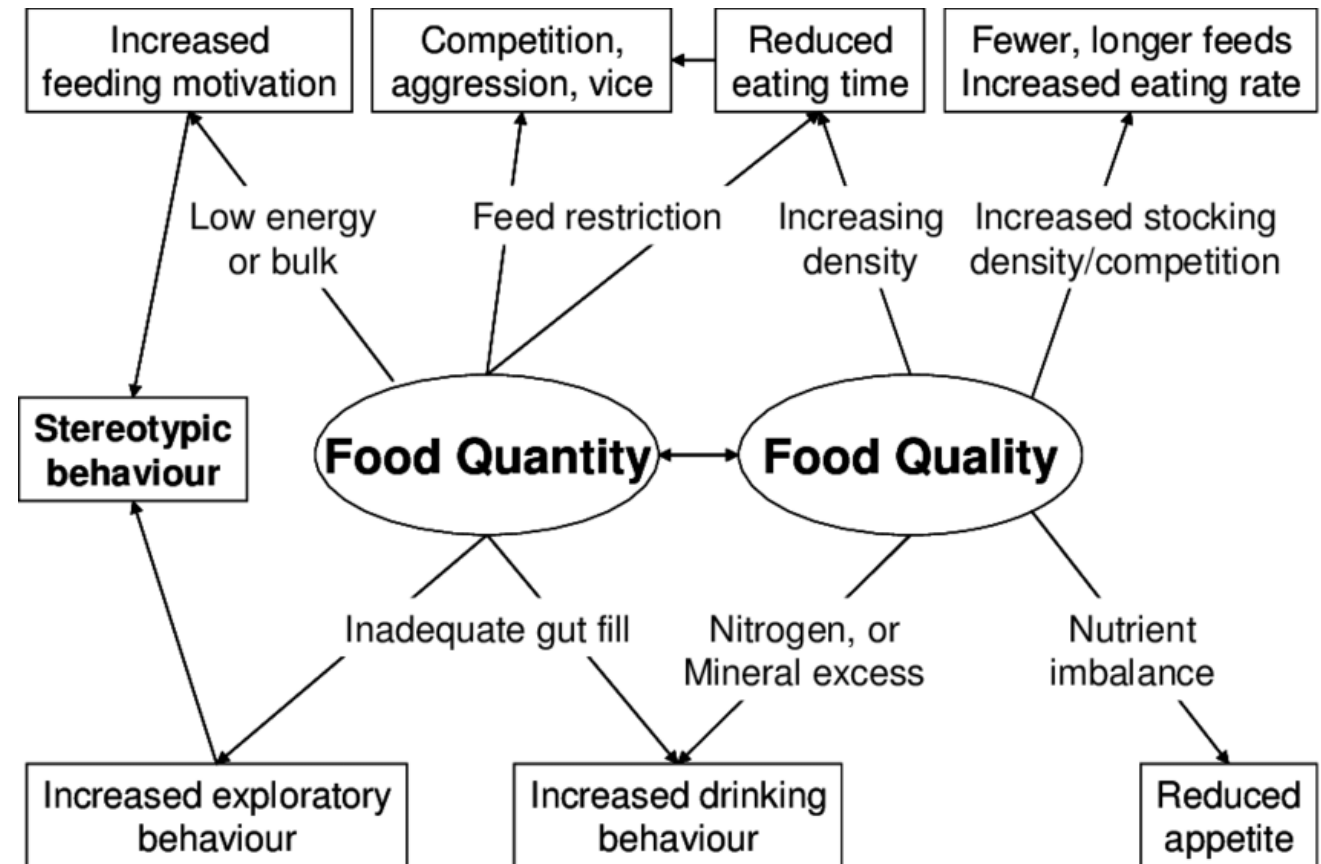
## 27. Feed management for better BCS

- Maximize feed intake (for example, total mixed ration feeding system is most efficient).
- Adjust energy density of the ration.
- Adjust crude and escape protein levels.
- Provide adequate fiber to prevent off-feed problems or chronic intake fluctuations.
- Check macro mineral (Ca, P, Mg and K) levels and water availability.



## 28. Feed intake signal

- Both rumen fill and body condition score are cow signals for feed intake assessment.
- Rumen fill is short term (one day) while BSC is for a long term (one month) assessment.
- Rumen fill can be changed, if not met, within a day or two. However, BSC will take some weeks to change.
- Rumen fill is affected by quantity of feed intake.
- BSC is affected by both quantity and quality of feeds intake.



## 28.1 Feed intake signal Cont'd...

- Therefore, a cow can have rumen fill of 4-5 but the quality of feed consumed might not meet the body requirement of the cow.
- Monitoring feed intake is important to achieve both rumen fill and recommended BCS.
- Feed intake can be improved by formulating rations for every group of cows in different stages.
- Farmers should always assess feed intake by weighing leftovers and assessing rumen fill daily.

