Feeding Management of Dairy Cattle

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Feeds represent the most expensive input cost for the livestock producer

➢ **Expensive to maintain the animal** - Large amounts of nutrients are required to simply maintain weight, much less to increase production or performance

➢ **Expensive if don't supply nutrient in adequate amounts to get good performance** - Insufficient nutrient intake results in decreased performance and at starvation levels, possible death

➢ **Expensive if overfeed nutrients relative to the animal's requirements** - Excessive nutrient consumption results in inefficient fat deposition
Feed shortage

- Main constraint to improve the performance of the livestock sector in Ethiopia
- Poor nutrition => poor performance of livestock
  - Inefficient feed utilization
  - Slow growth rate
  - Poor production and reproduction performance
  - Increased susceptibility to diseases
Livestock feeding strategies

- Type of livestock production system
- Available feed resources
- Market access – inputs & outputs
- Relative price of inputs and outputs
- Location
- Season
- Production objectives
Animals require nutrients for:

- **Maintenance**
  - Basic needs of an animal when it is not producing anything
  - No loss no gain

- **Production**
  - Growth and body weight gain
  - Production of milk, egg, wool etc.
  - Work output (in working animals)

- **Reproduction** (e.g. Pregnancy)
Factors affecting requirements

- Age and body weight
- Level of production (milk, growth etc)
- Work (eg walking)
- Stage of reproduction (pregnancy)
- Management, stress, disease
- Diet (balance & interactions)
- Nutrient availabilities
Nutrient requirement of ruminants – two considerations

- Requirement of rumen microbes (for efficient fermentative digestion)
  - Rumen degradable substrates

- Requirement of the host animal
  - Products of fermentative digestion and nutrients that by-pass fermentation
The host ruminant animal

- Use both products of fermentative digestion and bypass nutrients
- High demand for nutrients during early stages of growth, late pregnancy and lactation
- Supply of protein from fermentative digestion is not sufficient during such stages of high nutrient demand
Allowances & annual production cycle (dairy cows)

- **Early lactation**
  - Peak milk yield, DMI, start cycling, fertilization

- **Mid lactation**
  - Establish and maintain pregnancy

- **Late lactation**
  - Regain condition and prepare for next pregnancy

- **Dry period**
  - Sets up cow for next lactation
Nutrient requirement of dairy cows

- It is proportional to amount of milk produced

- Major nutrients required are: energy, protein, Ca and P
What is practical dairy nutrition?

- Maximize DM intake thus milk solids production
- Minimize input costs
- Match nutrient inputs to requirements
- Maximize reproductive performance
- Avoid nutritionally related disorders
- Manipulate product profile and quality
Important considerations in dairy cattle nutrition

- Feeding the right amount of
  - Carbohydrates and fats – Energy sources
  - Protein – for building their muscles
  - Minerals – to build strong bones
  - Vitamins – for proper functioning of the body

- Adequate supply of water
Feeding practices

Cafeteria style (current practice)
- Hay fed free choice
- Hay and/or silage fed a given amount
- Concentrate a mixture of by-products
  - Oil seed Cakes
  - Wheat bran
  - Wheat short
  - Brewers grain

Total mixed ration
- Concentrate + Roughage all mixed together
- Hay and straw need to be chopped into smaller pieces for proper mixing

Advantages
- Avoids selection of feed by cows
- Higher intake
- Higher milk prod.
- Less feed cost
- Feeds previously hard to feed can now be fed
Mixing Systems

Incoming ingredients
By-products

Concentrates

1. Mixer
2. Shovels
3. Trough

Consistency in mixing!
Nutritional Challenges

- Milk yield
- Appetite
- Bodyweight

This is when fresh calvers should be in positive energy balance.

- Calving
- Months After Calving
- Calving
Dairy cow feeding

- **Good feeding**
  - Strong and healthy animals
  - High reproductive performance
  - High milk production => more income

- **Poor feeding**
  - Animals lose condition, become weak and susceptible to disease
  - Cows may not become pregnant
  - Low milk production => less income
Nutritional Challenges

- Milk yield
- Appetite
- Bodyweight

This is when fresh calvers should be in positive energy balance.

Calving: -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Months After Calving

Calving
Figure 6. Lactation cycle phases with corresponding changes in milk production, milk fat percentage, milk protein percentage, DM intake, and body weight.
Rations which are deficient in any particular nutrient can:

- Decrease milk production
- Decrease growth rate of heifers
- Decrease reproduction efficiency
- Cause health problems

Rations which contain excess nutrients:

- Decrease profits
- May cause other health problems
Priority of decision making

- Energy
  - amount, source
- Protein
  - rumen RDP, bypass UDP
- Effective fiber
  - structure
- Minerals & Vitamins
  - (re)production, health
- Other factors
  - interactions, stress

- Maximize sustainable production
- Optimize inputs vs outputs
To make good use of animals, feeding has to be planned properly throughout the year

- **Long term planning**
  - Feeding of the whole herd should be considered for one year

- **Short term planning**
  - follow up of long term planning to implement decisions
Long term planning

- The amount and qualities of feed produced on the farm (pasture, hay, forage crops, crop residues etc.)
- Production goals of different animal groups
- Feed requirement of different animal groups during the year based on average feeding plans
- Optimal number of animals that can be kept on the farm under the prevailing conditions
- Requirement of supplementary feeds (concentrate, minerals etc.) to be bought from outside.
Short term planning

- Grouping of animals according to production performance level (e.g., Milk yield)
- Making feeding lists for different groups of animals
- Making sure that the feeds needed are available (by ordering them in time)
- In cases of shortage of feed, try to find alternative solutions
Rations need to be reformulated when the type of feed or the quality of the forage changes.

To accurately evaluate forage quality, forages must be tested whenever a change is expected in the quality.

The amount and type of concentrate mix needs to match the type and quality of forages fed to the milking herd, dry cows and heifers. More concentrate of high energy density needs to be fed with poor quality forages.

Many different combinations of forages and concentrates will meet the nutrient needs of cows. The goal is to find a cost efficient combination, which the farmer is comfortable feeding and which is balanced to meet the cows nutrient needs.
Farmers should work closely with professional nutritionists in designing a feeding program so that the nutrient needs of the cows are met and at the same time feed cost is minimized.

With high feed price, there is a tendency to cut back on the amount of concentrate feeds. By so doing the farmers may save on the feed cost and may lose more by milk production lost (as cows respond by producing less milk)

- The cheapest feedstuffs may not always be the most economical ingredients.

The moisture content of high moisture feedstuffs should always be considered when calculating their nutritive value.
Summary (continued)

- When feed supply is short, cull the unproductive cows and allocate the available resources to the most productive cows (the money makers).

- Feed bunk management is important - to encourage cows to eat as much of a properly balanced ration as possible.

- Commercial forage production (high yielding and good quality forages).
Thank you!