# ANIMAL NUTRITION AND FEEDS



# What is Nutrition!

Nutrition is the science of dealing with the utilization of food by the body processes which transforms food into body tissues and energy.



## **Utilizations**

Nutrients are utilized by the animals for:

- Maintenance
- Growth
- Production
- Reproduction
- Health control



# Importance

- To obtain and utilize surplus or unusable feed stuffs
- And convert them to

desirable products such as

• meat, milk, eggs, fiber

#### and work.



# What is a Nutrient?

A single class of food or group of like foods that aids in the support of life and makes it possible for animals to grow or provide energy for physiological processes.

# **Digestible Nutrient**

# The portion of the nutrient which may be broken down (digested) and absorbed and used by the body.

# The Six Nutrients Needed

- Protein
- Carbohydrates
- Fats
- Minerals
- Vitamins
- Water

# PROTEINS

- Needed for growth and repair
- Helps form muscles, internal organs, skin, hair,wool, feathers, hoofs and horns
- Contain carbon, hydrogen, oxygen and nitrogen

# MEAL

## EXAMPLES OF PROTEINS

**1. MEAT AND BONE** 

2. FISH MEAL

**3. SOYBEAN MEAL** 

**4. COTTONSEED MEAL** 

**5. DRIED SKIM MILK** 

6. AMINO ACIDS

# CARBOHYDRATE S

- Furnish energy for body functions, growth and reproduction
- The largest part of the animals food supply and usually the fibrous part of the diet
- Include sugars, starch and cellulose
- •Are made of carbon, oxygen and hydrogen





- Furnish a concentrated source of energy, up to
  - 2.25 times as much energy as carbohydrates do
- Form cholesterol, steroids and other body compounds
- Found in every cell in the body
- Affect the condition of skin and hair
- Are made of carbon, oxygen and hydrogen, but contain much larger proportions of carbon and hydrogen than carbohydrates do
- They also provide energy reserves, protection for vital organs, and they insulate the body

# MINERALS

- Primarily found in bones and teeth
- Important in blood for the carrying of oxygen
- Regulates heartbeat with potassium, sodium and calcium



# **Major Minerals**

- The major minerals are
- calcium, phosphorus, sodium, chlorine, magnesium, and potassium.
- They are required at comparatively high levels described as per cent of diet or grams per day.



# **Minor Minerals**

- They are required only in very small amounts.
- Some minerals fed in excess amounts may cause a deficiency in others
  - Iron, Zinc, Copper, Manganese, Cobalt, Iodine, Molybdenum, Selenium, Fluorine



## **Vitamins**

- Are only needed in small amounts
- Are essential for life and health
- Provide a defense against disease, promote growth and reproduction
- Contribute to the general health of the animal
- •Vit. A, B, C, D, K, E etc



• Accounts for 70% or more of the composition of most plants and animals













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### How much do animals drink per day?

- Beef cattle: 7-12 gallons per head
  - Dairy cattle: 10-16 gallons per head
- Horses: 8-12 gallons
- Swine: 3-5 gallons
- Sheep and goats: 1-4 gallons
- Chickens: 8-10 gallons per 100 birds
- Turkeys: 10-15 gallons per 100 birds



## **Factors for Control**

#### Water Quality

- Salinity, acidity, pollution, and algae growth

- Environmental Factors
  - Air temperature and feed quality
- Animal Factors
  - Breed differences, age, and condition of stock



## FEED CLASSIFICATIONS

#### 1. Roughages

- 2. Concentrates
- 3. Supplements





# ROUGHAGES

# High in Fiber and relatively low in digestible nutrients

#### **Examples of roughages:**

- 1. Alfalfa
- 2. Clover
- 3. Soybean
- 4. Oat hay
- 5. Corn Silage





# CONCENTRATES

# Are low in fiber and high in digestible nutrients

#### **Examples of concentrates:**

- 1. Corn
- 2. Cottonseed
- 3. Barley
- 4. Oats
- 5. Sorghum





• Supplements are extras that supply the body with additional nutrients.

- Some of the supplements are minerals salt, copper, iodine and iron
- Vitamin A and D are also very important to ruminant animals





Copper



Iron



# **Mineral Mixture**

Ingredients	Percent
DCP	63.25
Sodium Chloride	35.00
Copper sulphate	00.25
Ferrous sulphate	00.75
Magnese sulphate	0.10
Zinc sulphate	0.50
Cobalt sulphate	0.10
Potassium iodide	0.05
Total	100



#### Feed Availability & Demand in Pakistan





## **Feeding Management** An Art that need to know; Requirements of the animal according to milk yield & lactation stages Nutrient composition of available feeds & How to combine different feeds to match the animal requirements Should be **Balanced** approach

- Cost effective
- Sustainable

#### **Improvement in Utilization of Feed Resources**



# How to over come the dry period feed scarcity problem

- Conserve green fodder as silage (maize fodder, sugar cane tops, oats, mott grass etc)
- Hay making (Berseem/lucern)
  - Adopt urea treatment of straw for improved feed value
- Offer multinutrient feed blocks when poor quality forages are fed.



# Silage Making







# Molasses-urea Blocks are suitable with poor quality forages during dry period





# Molasses-Urea Blocks can be prepared on farm





# Feeding ruminant animals at different life stages



Start from Pregnancy to End of Lactation Period (Peak, mid, late lactation)

# **Dairy Nutrition**

Nutrition is important in order to be profitable in the dairy industry from growth of the calves through milk production in lactating cows.





# **Stages of A Dairy Cow**

- Calf
- Heifer
- Dry Cow
- Close-up Cow
- Lactating Cow



# **Digestive system**





# **Calf Nutrition**

- Calves are born as monogastric animals (simple stomach)
  - So offer feed that must be easy to digest (high quality digestable proteins, energy, vitamines and minerals)







# **Calf Nutrition**

- Energy is important first two weeks because can not digest starch, sugar or unsaturated fats.
- Colostrum feed at first feeding to get higher amounts of protein, minerals, immunoglobulins, and antibodies. Lines to walls of digestive tract to protect against diseases







# **Calf Nutrition**

- Grains (Dry Matter) stimulate production of VFAs in rumen (acetic, propionic, butyric)
- Digestive system develops from 2 weeks until 4-6 months and calf evolves into ruminant





# **Heifer Nutrition**

- Nutrition is important at this time because reproduction depends on sound, healthy animals.
- If underfed, diseased or have parasites then puberty is delayed. Low energy will lead to ovarian inactivity. Low protein will cause irregular or silent heats.
- 30-40% of adult weight at breeding age (13-15 months)





## **Heifer Nutrition**

- Pasture is a good choice of forage (high energy and less expensive)
- 3 lbs concentrate/ day
- 12% crude protein, 15% crude fiber and .41% Calcium at 6 months, .29% Calcium at 12 months



Final 3 months of pregnancy heifer will need extra nutrients for developing calf

# **Dry Cow Nutrition**

- Low energy diet (less expensive)
- Pasture often used
- Important for successful lactation to follow
- Restore body energy and nutrient reserves
- Want to maintain 3+ to 4- body condition score



## **Feeding in Pregnancy** (Last 2 months)

For;

- Rapid growing foetus
- Develop body reserves for use in subsequent lactation

How;

- Give rest if in milk (forced drying)
- Feed concentrate 2 kg/day + good quality fodder, restrict straw



# **Close-up cows**

Move cows and heifers to close-up pen at 2 weeks before calving

 High dry matter intake to gain nutrients for cow and calf to reduce metabolic problems





# **Close-up Cows**

- Start grain feeding
- Increase CP to 15%
- Limit added fat 100 gm/d
- Low energy with adequate levels of minerals vitamines and protein and watch forage levels (<50% DM)</p>
- Decrease metabolic problems and maintain condition while not lactating
- Decrease Calcium to begin to use stored Ca to prepare for lactation changes



## **Early lactation (First 60 days)**

- Most critical period
- Period of peak milk yield
- Higher the peak yield more will be the milk yield throughout lactation until drying off.
- Good quality forage
- Maintain healthy level of fiber
- Avoid high starch level
- Undegradeable protein & digestible fiber



# **Lactating Cows**

- Highest energy diet (most expensive)
- Supports not only growth, reproduction and maintenance but also production
- Free feed at all times to increase and support production



**Consequences of Feed Restriction in early lactation as a traditional practice** 

- Low peak milk production & total lactation yield
- Drastic body weight losses in high potential cows leading to;
- Metabolic diseases ( milk fever, acetonaemia, red water disease etc)
- Delayed estrus resumption
- Long dry period



# **Suggestions**

- Select & mix different ingredients on basis of nutritional profile for making concentrate mixture (change from cakes to meals, e.g. SBM)
- Always add minerals especially take care of Calcium & Phosphorus ratio in the rations
- Plan your feeding program to raise the peak milk yield
- Never restrict feed & water soon after parturition



# Suggestions

- Avoid large fluctuation in green fodder supply through hay and silage making
- Make best use of local feed resources with relevant supplementation & conservation
- Improve feeding value of straw through urea treatment for fodder scarcity period
- Use feed additives to boost milk production.

# Thank You!