



**LIVESTOCK PRODUCTION MANAGEMENT**

# **UNIT-1**

# DEMOGRAPHIC DISTRIBUTION:

Species	Characteristics	Role in Indian economy
<b>Cattle</b>	India has largest cattle population in the world	India first in milk production (per capita 459 gram)
<b>Buffalo</b>	Primerily used for milk production	India 8th in meat production (per capita 7.1kg/annum)
<b>Sheep</b>	Reared for meat(mutton),milk and wool production	Total wool in India 33.6 million kg
<b>Goat</b>	Reared for meat(chevon),milk and hide production	Chevon shares 16% of total meat production in India
<b>Poultry</b>	egg and meat production	India 3rd in egg production (per capita 526 egg/annum)

**Note-livestock contributes around 4% to national GDP & 25% to agriculture GDP.**



# Problems & prospects of livestock industry in india

Problems	Prospects
Low productivity	Improve genetic quality of livestock
Disease prevalence impact productivity	Government initiatives
Inadequate infrastructure	Expansion of dairy sector
Quality of feed & fodder shortage	Use of digital tools & biotechnology

# Common animal husbandry terminology

- **Culling:** Removing non-productive or undesirable animals from a herd.
- **Estrus (Heat):** Period when female animals are receptive to mating.
- **Weaning:** Transitioning young animals from mother's milk to solid feed.
- **Colostrum:** First milk rich in antibodies, crucial for newborns.
- **Gestation:** Pregnancy period from conception to birth.
- **Lactation:** Period when a female produces milk after giving birth.
- **Quarantine:** Isolating animals to prevent disease spread.
- **Vaccination:** Administering vaccines to protect animals from diseases.

# Common animal husbandry terminology

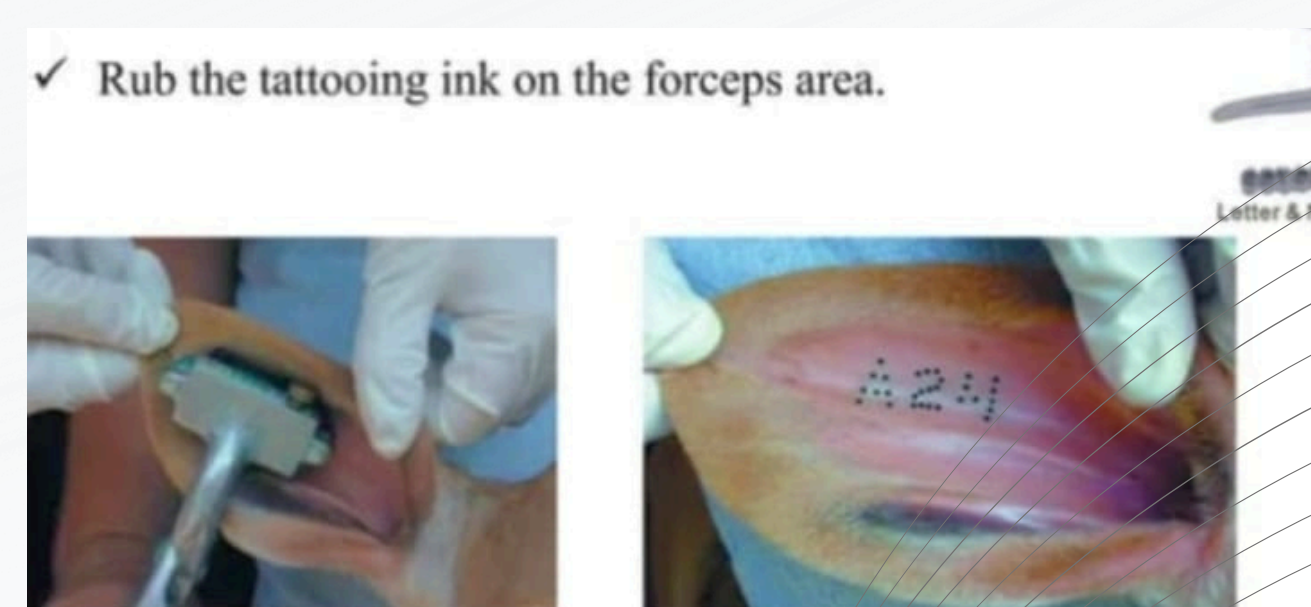
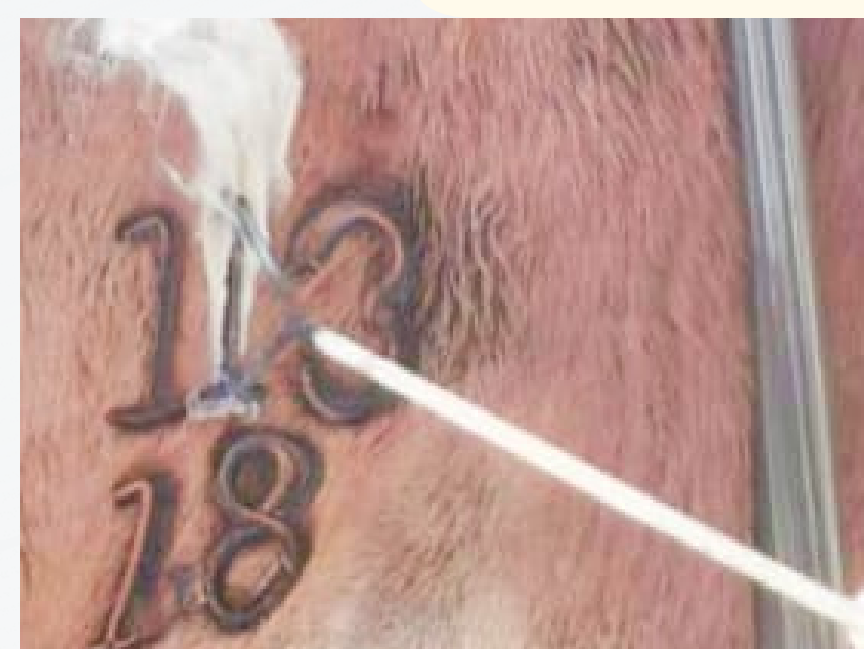
- **Feed Conversion Ratio (FCR):** Efficiency of converting feed into **body mass**.
- **Forage:** Edible plants like grasses and legumes for animal feed.
- **Pasture:** Land with vegetation for grazing.
- **Tethering:** Tying an animal to limit its movement and grazing area.
- **Silage:** Fermented forage stored in silos, used as animal feed.
- **Castration:** **Removal of testicles in male animals** to control breeding.
- **Estrous Cycle:** **Reproductive cycle phases in female animals**.
- **Heat Stress:** Condition where excessive heat affects animal health and productivity.



- **Conformation: Assessment of an animal's physical structure.**
    - o **Cattle: Udder, body capacity.**
    - o **Sheep/Goats: Wool, muscle development.**
    - o **Poultry: Feather quality, body shape.**
- Identification:**
- Animal identification is the process of marking animals to distinguish them from others, essential for management, breeding, health monitoring, and legal purposes.

# 1. Permanent Identification Methods

- **Branding:**
  - Hot Iron Branding
  - Freeze Branding
- **Tattooing:** permanent ink mark (usually inside the ear)
- **Ear Notching:** Cutting a pattern into the ears of animals, commonly in pigs.
- **Microchipping:** Inserting a small electronic chip under the skin with ID number.
- **Ear Tags:** Attaching numbered or barcoded tags to the ear.





## 2. Temporary Identification Methods

- **Paint Marking:** Applying paint on the fur or wool.
- **Collars/Neckbands:** commonly used in dairy animals.
- **Leg/Wing Bands:** commonly used in **poultry**.





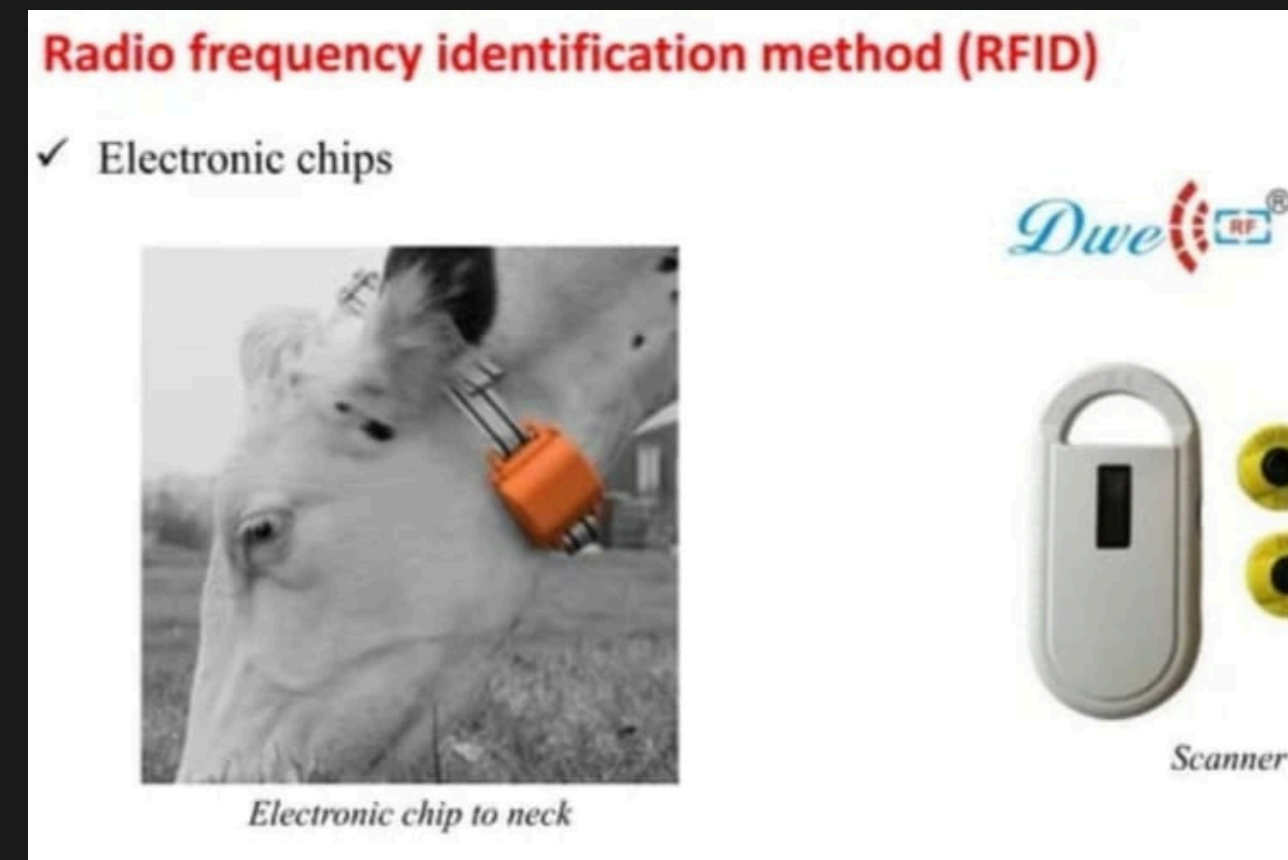
### 3. Electronic Identification Methods

- Radio Frequency Identification
- Electronic Collars

### 4. Genetic Identification by DNA profiling

### 5. Visual Identification

- Natural Markings
- Photographic Records



# Livestock Transportation:

Transportation of animals from one location to another.

## Key Considerations in Livestock Transportation:

### 1. Preparation Before Transport:

- o Health Checks
- o Documentation
- o Feed and Water

### 2. During Transport

- o Regularly check animals for signs of distress or injury.
- o Provide feed and water at regular intervals.

### 3. Loading and Unloading:

- o Gentle Handling
- o Ramps with a gentle slope

### 4. Vehicle Requirements:

- o Appropriate Design
- o Cleanliness
- o Temperature Control

### 5. Post-Transport Care:

- o provide rest & feed and water.
- o Check for signs of illness or injury.
- o Quarantine

# Common Farm Management Practices

Essential for maintaining the health, productivity, and safety of livestock.

1. Disinfection

2. Isolation

3. Quarantine

4. Disposal of Carcasses

5. Biosecurity

6. Record Keeping

7. Regular Health Checks

8. Feeding and Nutrition

9. Pest and Parasite Control

10. Shelter and Housing



# Common Vices of Animals and Their Prevention

## CATTLE AND BUFFALO:

- **Kicking:**
  - o Prevention: Calm handling, using anti-kick devices, and ensuring comfortable milking environments.
- **Sucking (Self or Other):**
  - o Prevention: Provide balanced nutrition, and use weaning devices like nose rings.

## SHEEP AND GOATS:

- **Butting:**
  - o Prevention: Provide ample space, socialization, and reduce competition for resources like feed and water.
- **Wool Eating:**
  - o Prevention: Provide a balanced diet with sufficient roughage.

## **Other vices-**

- **Cannibalism:** Proper stocking, feed, and beak-trimming.
- **Pica** : Balanced diet, clean environment.



# Livestock Production Systems

## Intensive Systems:

- Characteristics: High input/output. Common in dairy farming, poultry, and pig farming.
- Advantages: High productivity, better disease control.

## Extensive Systems:

- Characteristics: Low input/output. Animals are raised on natural pastures. Common in sheep, goat, and cattle.
- Advantages: Lower costs, sustainable use of natural resources.

## Semi-Intensive Systems:

- Characteristics: Combines aspects of both intensive and extensive systems. Animals are kept in confinement but are also allowed access to grazing areas.
- Advantages: Balanced productivity, more efficient use of resources than extensive systems.





## **SPECIALIZED SYSTEMS:**

- o **Dairy Production:** Focus on milk production with specialized breeds (e.g., Holstein dairy farms).
- o **Meat Production:** Specialized in breeding and raising animals for meat (e.g., pork or poultry farms).
- o **Wool Production:** Focused on breeding sheep for wool (e.g., Merino sheep farms).

## **INTEGRATED SYSTEMS:**

Combination of livestock and other agricultural activities for mutual benefit.

- o **Agroforestry Systems:** Integrating trees with livestock production (e.g., silvopasture).
- o **Aquaculture-Livestock:** Integration: Combining fish farming with livestock (e.g., fish ponds with poultry).



# Animal Holding and Land Holding Patterns in Different Agro-Climatic Zones

## **TROPICAL ZONES:**

- *Livestock Types:* Predominantly cattle, buffalo, goats, and poultry. The focus is on dairy production and mixed farming systems.
- *Land Holding Patterns:* Small to medium-sized landholdings with mixed farming.

## **ARID ZONES:**

- *Livestock Types:* Sheep, goats, camels, and drought-resistant cattle breeds. The emphasis is on extensive grazing systems.
- *Land Holding Patterns:* Larger landholdings with extensive grazing areas.

## **TEMPERATE ZONES:**

- *Livestock Types:* High-yield dairy cattle, sheep for wool and meat, and poultry. Intensive dairy farming is common.
- *Land Holding Patterns:* Small to medium-sized landholdings with a focus on dairy farming and high-input livestock production systems.

# Judging and BCS for Body Parts of Livestock

## JUDGING:

- **Dairy Cattle:** Evaluating the udder, teat placement, body capacity, and dairy strength.
- **Beef cattle:** Evaluating muscle development, frame size, and structural soundness.
- **Sheep:** Evaluating wool quality, and For meat breeds evaluate muscle development and fat distribution .
- **Goat :** judging the udder quality for dairy breeds and muscle mass for meat breeds.
- **Poultry:** Assessing feather quality, body shape, weight, and overall health.

## BODY CONDITION SCORING (BCS):

- **Cattle:** Range from 1 to 5, where 1 is emaciated, & 5 is obese. 3 is considered ideal.
- **Sheep and Goats:** ranges from 1 to 5. Ideal scores vary depending on the production stage, with a score of 2.5-3 being typical for maintenance.
- **Poultry:** ranges from 1 to 5, focusing on the keel bone and breast muscle development.

# Preparation of Animals for Show

## Grooming:

- **Brushing and Washing:** brushing removes dirt and loose hair, stimulates blood circulation, and improves coat condition.
- Washing should be done a few days before the show.
- **Hoof Care:** Hooves should be trimmed and cleaned.
- **Clipping and Shearing:** Dairy cattle, sheep, and goats may require clipping or shearing to enhance their appearance.

## Training:

Teaching the animal to stand still in the correct posture is essential for showing.

## Health Checks:

- **Vaccination and Deworming**
- **Diet and Nutrition**



# Culling of Animals

**Process of removing certain animals from a herd/flock based on specific criteria such as health, productivity, or genetic quality.**

- **Methods of Culling:**

- **Selective Culling:** Remove animals based on low productivity, chronic health issues or age.
- **Voluntary Culling:** Remove animals by choice for genetic improvement or herd management.
- **Involuntary Culling:** Cull animals due to severe illness, injury, or financial constraints.
- **Emergency Culling:** Rapid removal due to disease outbreaks or natural disasters.
- **Humane Euthanasia:** Humanely euthanize suffering animals following ethical guidelines.
- **Market Culling:** Cull animals based on economic factors or changes in market demand.



# Selection and Purchase of Livestock

**Selection is process of choosing specific animals from a population or group based on certain desirable traits or characteristics. The goal of selection is to improve the overall quality of the herd or flock by enhancing traits that are beneficial for productivity, health, and adaptability.**

## **Selection Criteria:**

- **Breed:** Well-suited to the local climate, and intended production purpose (e.g., dairy, meat, wool).
- **Health Status**
- **Age and Productivity**
- **Conformation:** This includes body size, udder quality, and muscle development.

## **Purchase Considerations:**

- Reputable source, pre-purchase inspection.
- Documentation, safe transport.



# Unit 2

## FODDER PRODUCTION AND CONSERVATION



# Importance of grasslands and fodder in livestock production.

## 1. GRASSLANDS -

- Cover 36% of world's continental surfaces
- Main feed base for grazing livestock
- Produce biomass for direct grazing or harvested as fodder
- Provide high-quality, inexpensive livestock feed
- Help protect soil from erosion
- Animal products influenced by grassland quality

## 2. FODDER PRODUCTION

- Critical food source for livestock
- Provides essential nutrients (protein, fiber, carbohydrates)
- Quantity and quality determine feeding value
- Supports livestock production and food security

## 3. SUSTAINABILITY CHALLENGES



- Converting grasslands to croplands leads to soil
- Balance livestock production with environmental sustainability
- Trade-offs between short-term gains and long-term losses



## **IMPORTANCE OF GRASSLAND ECOSYSTEMS**

- Support biodiversity
- Role in carbon sequestration and climate change mitigation
- Provide habitat for threatened/endangered species
- Offer ecosystem services (water regulation, soil formation)

## **GRASSLAND MANAGEMENT PRACTICES**

- Rotational grazing allows pasture recovery
  - Diversify pastures with grasses and legumes
  - Implement sustainable practices (controlled grazing, weed management)
  - Maintain long-term productivity and ecosystem health
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# Agronomical Practices for Fodder Production

## 1. Use of High-Yielding Fodder Crops

- Select high-yielding, disease-resistant varieties adapted to local conditions.

## 2. Intercropping and Mixed Cropping Crops

- Sow legumes with non-legume crops to enhance nutritional value and improve soil fertility.

## 3. Perennial Fodder Crops

- Perennial grasses (e.g., hybrid napier, guinea grass) for year-round green fodder.

## 4. Fodder Trees and Shrubs

e.g., Leucaena, Gliricidia)

- Trees improve soil health and provide shade.

## 5. Proper Harvest Management

- Harvest fodder at the optimal growth stage to maximize nutrient content.
- Use chaff-cutters to minimize wastage during feeding.

## 6. Fodder Conservation

- for hay and silage making to preserve surplus fodder.
- Store conserved fodder properly to prevent spoilage.

## 7. Soil and Water Conservation

- Implement soil conservation techniques to enhance soil fertility and moisture retention.
- Use rainwater harvesting and proper drainage to support fodder crops.

## 8. Integrated Farming System

- Integrate fodder production with crop cultivation and animal husbandry.
- Utilize animal waste as fertilizer for fodder crops.

## 9. Nutrient Management

- Conduct soil tests to determine nutrient needs and apply fertilizers.
- Use organic amendments (compost, manure) to improve soil health.



# Important leguminous fodders crop

Winter season crop	Summer season crop	Rainy season crop
<p><b>1. Berseem</b> <b>(<i>Trifolium alexandrinum</i>)</b></p> <ul style="list-style-type: none"><li>rich in protein and minerals.</li><li>Improves soil fertility through nitrogen fixation and provides high-quality green fodder.</li></ul>	<p><b>1. Cowpea</b> <b>(<i>Vigna unguiculata</i>)</b></p> <ul style="list-style-type: none"><li>fast-growing annual legume.</li><li>high protein fodder &amp; improves soil fertility.</li></ul>	<p><b>1. Soybean (<i>Glycine max</i>)</b></p> <ul style="list-style-type: none"><li>used as both fodder crop &amp; for grain production.</li><li>Enhances soil nitrogen levels</li></ul>
<p><b>2. Lucerne (<i>Medicago sativa</i>)</b></p> <ul style="list-style-type: none"><li>high protein content and digestibility.</li><li>Excellent for hay production &amp; can be harvested multiple times in a season.</li></ul>	<p><b>2. Guar</b> <b>(<i>Cyamopsis tetragonoloba</i>)</b></p> <ul style="list-style-type: none"><li>drought-resistant legume</li><li>high protein content</li><li>Requires warm temperatures to grow</li></ul>	<p><b>2. Moth Bean</b> <b>(<i>Vigna aconitifolia</i>)</b></p> <ul style="list-style-type: none"><li>drought-resistant legume</li><li>Provides good quality fodder</li><li>Grows well in sandy soils &amp; requires minimal water.</li></ul>

# Important Non-leguminous fodders crop

Winter season crop	Summer season crop	Rainy season crop
<b>1. Oats (<i>Avena sativa</i>)</b> <ul style="list-style-type: none"><li>• <b>High in energy and fiber,</b></li><li>• harvested for grain or green fodder.</li><li>• Use for both grazing &amp; <b>silage</b></li></ul>	<b>1. Maize (<i>Zea mays</i>)</b> <ul style="list-style-type: none"><li>• <b>Annual grass</b></li><li>• Used for silage</li><li>• Requires fertile, well-drained soils .</li></ul>	<b>1. Bajra (<i>Pennisetum glaucum</i>)</b> <ul style="list-style-type: none"><li>• <b>Drought-resistant millet</b></li><li>• Provides nutritious fodder</li><li>• Requires warm temperatures to grown</li></ul>
<b>2. Barley (<i>Hordeum vulgare</i>)</b> <ul style="list-style-type: none"><li>• used as fodder and grain.</li><li>• Provides good quality feed.</li></ul>	<b>2. Sorghum (<i>Sorghum bicolor</i>)</b> <ul style="list-style-type: none"><li>• <b>drought-tolerant grass</b></li><li>• Use for <b>silage</b> making</li><li>• Harvest multiple times in a year</li></ul>	<b>2. Jowar (<i>Sorghum bicolor</i>)</b> <ul style="list-style-type: none"><li>• <b>drought-resistant cereal crop.</b></li><li>• High in fiber and energy</li><li>• Grows well in dry conditions</li></ul>



## Additional information

### • Nutritional Value:

Leguminous fodders are generally **higher in protein** compared to non-leguminous fodders

### • Crop Rotation

Implementing crop rotation with legumes and non-legumes can **improve soil structure**, reduce pest pressures.

### • Soil Health

Legumes fix **atmospheric nitrogen**, which reduces the need for synthetic fertilizers and enhances soil fertility.

### • Water Management

Efficient irrigation are crucial, especially for crops grown in **arid and semi-arid regions**, to maximize yield and quality.

# Fodder Production for Small Livestock Units

## Importance of Fodder

- Essential for livestock health, productivity & milk production.
- Small units rely on forages, crop residues, and fodder crops.

## Seasonal Considerations

- **Flush Season:** Abundant green fodder available.
- **Lean Season:** Requires fodder conservation (hay, silage).

## Types of Fodder Crops

- **Leguminous:** High protein, nitrogen fixation (e.g., berseem, lucerne, cowpea).
- **Non-Leguminous:** Provide energy and bulk (e.g., maize, sorghum, bajra).

## Fodder Management Practices

- **Crop Rotation:** Improves soil health and nutrient availability.
- **Controlled Grazing:** Prevents overgrazing and promotes pasture recovery.
- **Irrigation:** Maintains fodder production during dry periods



# Structures for Storage of Feeds and Fodders

## Types of Storage Structures

1. **Hay Barns:** Store hay, protect from rain and moisture.
2. **Silage Pits:** Airtight pits for fermenting and storing silage.
3. **Feed Bins:** Store dry feeds (grains, concentrates).
4. **Silos:** Large vertical structures for bulk silage storage.
5. **Fodder Depos:** Designated areas for storing fresh fodder.

## Practices for Storage

- **Ventilation:** Prevent mold and spoilage.
- **Moisture Control:** Avoid fermentation and spoilage.
- **Pest Management:** Control pests and rodents.

# Soil and Water Conservation Practices

## **1. Soil Management:**

- Improve soil structure with reduced tillage and cover cropping.
- Add organic matter (compost, manure) to enhance fertility and moisture retention.

## **2. Water Conservation Techniques:**

- Implement drip irrigation for efficient water use.
- Utilize rainwater harvesting to collect water for irrigation.

## **3. Crop Selection and Rotation:**

- Choose drought-resistant fodder crops.
- Practice crop rotation to improve soil health and reduce pests.

## **4. Fodder Crop Management:**

- Harvest fodder at the optimal growth stage for maximum nutrients.
- Use controlled grazing to prevent overgrazing and allow pasture recovery.



## **5. Use of Fodder Trees and Shrubs:**

- Integrate fodder trees (e.g. Leucaena) for additional feed.

## **6. Drainage Systems:**

- Implement surface drainage to prevent waterlogging.

## **7. Integrated Farming Systems:**

- Combine livestock and fodder production for nutrient recycling.
- Use agroforestry to enhance sustainability.

## **8. Monitoring and Evaluation:**

- Conduct **regular soil tests** to assess nutrient levels.
- Evaluate water use efficiency to optimize irrigation.

## **9. Education and Training:**

- Provide training on best practices for soil and water conservation.
- **Collaborate with research institutions for improved techniques.**

# Scarcity of Fodders

## Current Situation

- **Deficit:** India has a 63.5% deficit in green fodder and 25% in dry fodder.
- **Pressure on Land:** Increasing human population reduces land available for fodder cultivation.
- **Crop Residues:** Over 44% of livestock feed comes from low-quality crop residues.

## Future Projections

- **Expected deficits by 2025:** 65% for green fodder and 25% for dry fodder.
- Need for a national fodder policy to address shortages.

## Contributing Factors

- Shift to high-yielding cereal crops decreases fodder availability.
- Lack of focus on scientific growth of fodder crops.



# Preservation of Green Fodder

## Short-Term Strategies

1. Sowing Short-Duration Crops: legumes like **cowpea** in rice fallows.
2. Fodder Maize & Sorghum: Plant early in the kharif season as pure or intercropped.
3. Dual-Purpose Crops: like **sorghum** for both grain and fodder.
4. Urea Application: Foliar spray to enhance growth and protein content.
5. Harvesting Perennial Grasses: like Guinea grass.

## Long-Term Strategies

1. Enhancing Perennial Grasses: Focus on drought-tolerant varieties.
2. Improving Pastures: Implement rainwater conservation and reseedling.
3. Introducing Fodder Trees: like Prosopis for additional fodder.

• **National Policies:** Develop comprehensive policies to support fodder production

# Recycling of Animal Washings and Wastes in Fodder Production

## Importance of Recycling

- Enhances fodder production by providing nutrient-rich resources.

## Sources of Animal Waste

- **Manure:** Produced by livestock (cattle, poultry).
- **Washings:** Water used for cleaning animals.

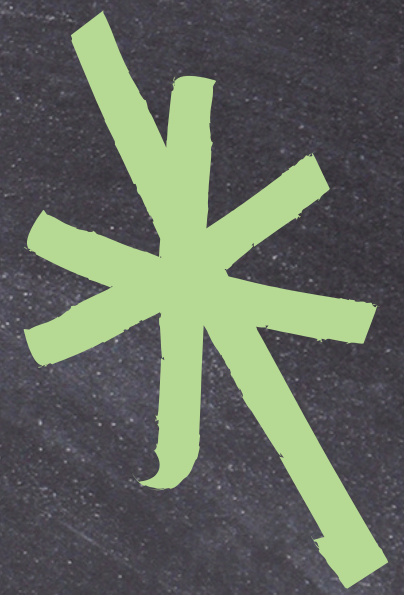
## Methods of Recycling

1. Direct Feeding: Dried manure can be fed to livestock.
2. Composting: Converts animal waste into organic fertilizer.
3. Liquid Fertilizer: Diluted washings can be used as fertilizer.
4. Biogas Production: Anaerobic digestion produces energy and digestate for fertilizer.

## Nutritional Value

- Contains essential nutrients (nitrogen, phosphorus, potassium).
- Protein content varies; poultry litter is typically higher than cattle manure.





# Unit 3

## LIVESTOCK PRODUCTION MANAGEMENT-RUMINANTS





# HOUSING SYSTEM OF LIVESTOCK

## 1. Types of Housing Systems

- **Loose Housing:** Animals kept in communal areas, allowing natural behaviors
- **Conventional Housing:** Individual stalls/pens
- **Pasture-Based Systems:** Open fields/pastures, natural behaviors, less infrastructure

## 2. Site Selection Criteria

- **Water Supply:** 40–50 gallons/day for lactating cows
- **Drainage:** Slope of 2–6% for effective drainage,
- **Soil and Topography:** prevent flooding
- **Accessibility:** Easy access for feed, equipment, animals

## 3. General Design Principles

- **Space Requirements:** Adequate space for movement, feeding, resting
- **Ventilation and Light:** Good ventilation, maximize natural light,
- **Building Materials:**
- **Sanitation and Waste Management:**

# ARRANGEMENTS OF BUILDINGS

## 1. Building Layout:

- **Loose Housing System:**  
Allows free animal movement.
- **Grouping of Animals:**  
Based on age and physiological condition for better management.
- **Proximity of Facilities:**  
like milking parlors and feed storage should be close together.

## 2. Ancillary Structures:

- include chaff cutter shed, feed store, milking parlors, and manure pits.

## 3. Design Considerations:

- Orientation to maximize sunlight and minimize harsh weather effects.

## 4. Building Materials for Construction

**Walls:** fire resistant, good insulation;  
**Roofs:** Insulating, Light weight and durable  
**Floors:** Durable & easy to clean, Good drainage.



# CLASSIFICATION OF CATTLE AND BUFFALO BREEDS

## 1. Milch Breeds (Dairy)

- **Cattle:**
- **Sahiwal:** High milk yield; heat tolerant (Punjab).
- **Gir:** High milk production; (Gujarat).
- **Red Sindhi:** hot and humid conditions.
- **Tharparkar:** (Thar desert).
- **Rathi:** High milk fat content (Rajasthan).
- **Buffalo:**
- **Murrah:** High butterfat; (Haryana).
- **Nili-Ravi:** High milk yield (Punjab).
- **Surti:** High butterfat content (Gujarat).
- **Jaffarabadi:** Heavy milch breed; (Gujarat).
- **Mehsana:** Murrah-Surti cross.
- **Bhadawari:** High butterfat (UP & MP)

## 2. Draught Breeds (Work)

- **Cattle:** Haryana: (Haryana, UP).
- **Ongole**

## 3. Dual-Purpose Breeds (Milk & Work)

- **Cattle:** Rathi, Kankrej, Deoni.
- **Buffalo:** Nagpuri

## 4. Specialty Breeds

- **Cattle:**
- **Vechur:** Dwarf breed, high milk fat.
- **Buffalo:**
- **Toda:** Small breed; adapted to hilly terrain

# MANAGEMENT AND FEEDING PRACTICES

**Calves:** Feed colostrum (consume 10% of their body weight) within 24 hours for passive immunity

- Introduce starter feeds at 3 weeks, high in protein and energy
- Provide clean, fresh water at all times
- Follow vaccination & deworming

## Heifers

- Provide balanced diet for growth and development
- Monitor body condition to reach breeding weight

## Pregnant Animals

- Increase energy, protein & Mineral like Ca & P in last trimester
- Minimize stress for successful calving

## Lactating Animals

- High quality forage, concentrates & Mineral like- Ca, P
- Monitor health for mastitis and other issues

## Dry Animals

- Reduce energy intake, maintain nutrition
- Provide good-quality roughage
- Prepare for next lactation

**Bulls** • High energy diet, minerals & vitamin to maintain reproduction

- Regular semen quality assessment

## Working Animals

- Energy-dense feeds for work demands

**Raising Buffalo Males for Meat-** Select best quality breeds

- Provide balanced diet rich in protein and energy

# Economic Traits and Management Practices

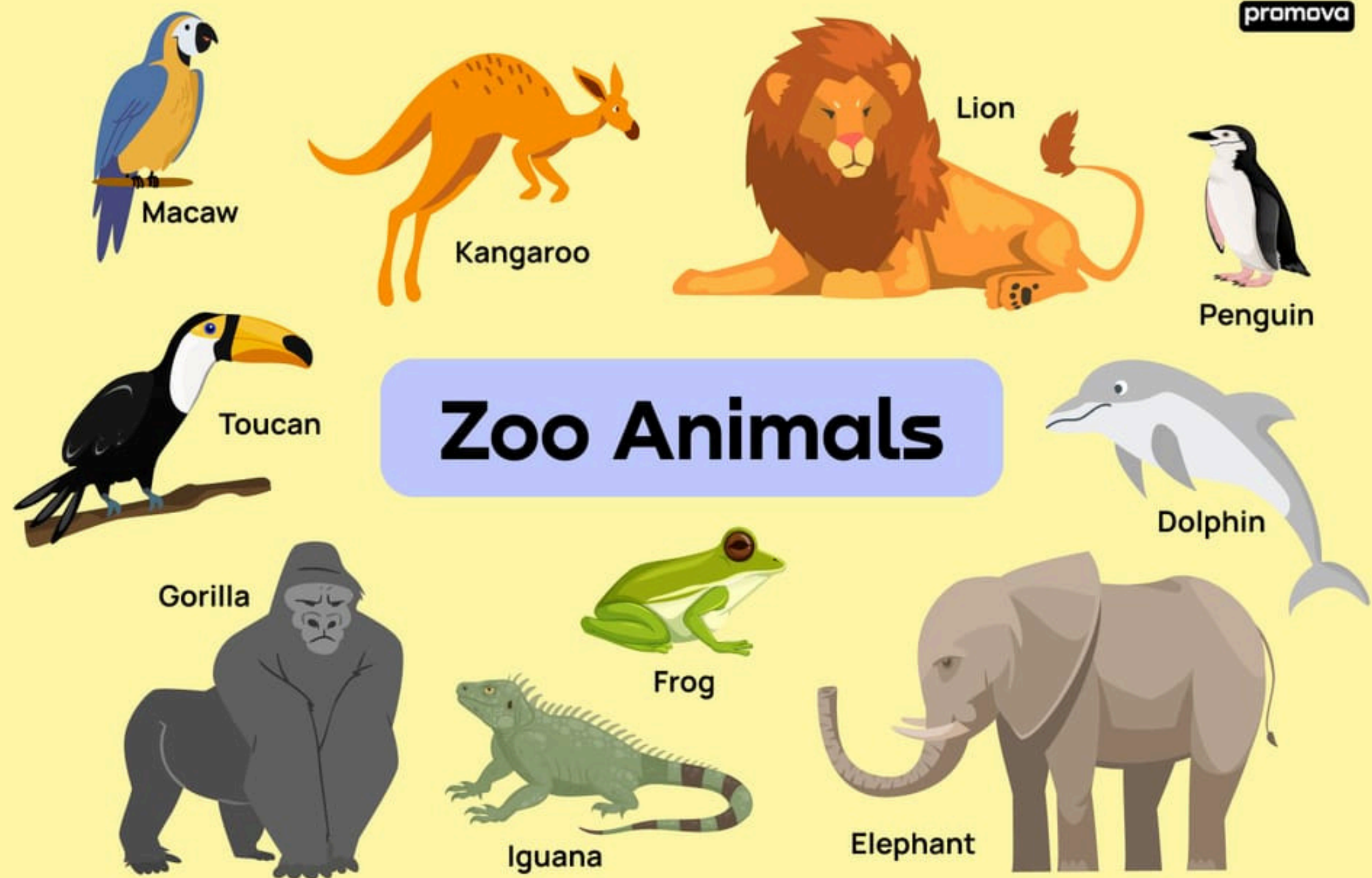
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Trait	Importance
Meat Production	Focus on growth rate, carcass composition, feed efficiency
Milk Production	Emphasize milk yield, butterfat content, lactation length,
Fiber Production	fleece weight, staple length, medullation percentage.
Breeding Management	Schedule breeding effectively; monitor health of breeding stock.
Weaning and Fattening	Gradual weaning; provide high-energy diets for fattening;



# Unit 4

## ZOO ANIMALS PRODUCTION&MANAGEMENT



# Taxonomy of Important Wild Zoo Animals

## Mammals

### Carnivores

- **Felidae:**  
Lions (*Panthera leo*),  
Tigers (*P. tigris*),  
Leopards (*P. pardus*)
- **Canidae:**  
Wolves (*Canis lupus*),  
Foxes (*Vulpes vulpes*)

### Herbivores

- **Cervidae:**  
Deer ( Indian Sambar,  
*Cervus unicolor*)
- **Elephantidae:**  
Asian Elephant  
(*Elephas maximus*)

### Primates

- **Hominidae:**  
Gorillas(*Gorilla gorilla*),  
Orangutans(*Pongo pygmaeus*)
- **Cercopithecidae:**  
Macaques  
(Rhesus Macaque,  
*Macaca mulatta*)



## Birds

- **Raptors:** Eagles (e.g., Indian Eagle, *Aquila nipalensis*)
- **Waterfowl:** Ducks (e.g., Indian Spot-billed Duck, *Anas poecilorhyncha*)

## Reptiles

- **Lizards/Snakes:** King Cobra (*Ophiophagus hannah*)
- **Turtles:** Indian Star Tortoise (*Geochelone elegans*)

## Amphibians

- **Frogs** (e.g., Indian Bullfrog, *Hoplobatrachus tigerinus*)

## Fish

- Various freshwater species in aquariums.



# Housing for Wild Zoo Animals

## 1.Objectives of Housing

- Protect animals from environmental extremes.
- Facilitate breeding and treatment.
- Minimize stress from human interaction.

## 2.Principles of Housing

- Adequate space according to species needs.
- Avoid overcrowding for comfort.
- Provide proper ventilation.
- Use appropriate flooring materials.

## 3.Enclosure Types

- Wet/Dry Moats: For non-swimming animals.
- Wire Mesh Fencing: For smaller herbivores.
- High-Tensile Wires: For larger carnivores.

## 4.Management Practices

- 1.Study animal behavior for suitable conditions.
- 2.Group animals by age, size, and sex.
- 3.Maintain hygiene to prevent disease.

# Size and Space Requirements for Wild Zoo Animal Enclosures

## Mammals

### Carnivores

(e.g.tigers, lions):

- Minimum: 0.4 hectares (1 acre) for one animal.
- Additional: 0.2 hectares (0.5 acres) for each extra animal.
- Vertical space: At least 5 meters (16 feet) high.

### Herbivores

(e.g.elephants, giraffes):

- Minimum: 0.8 hectares (2 acres) for one animal.
- Additional: 0.4 hectares (1 acre) for each extra animal.
- Vertical space: At least 5 meters (16 feet) high.

### Primates

(e.g.chimpanzees, gorillas):

- Minimum: 0.4 hectares (1 acre) for one animal.
- Additional: 0.2 hectares (0.5 acres) for each extra animal.
- Vertical space: At least 10 meters (33 feet) high.

# Size and Space Requirements for Wild Zoo Animal Enclosures

## Birds-

### **Raptors (e.g., eagles):**

- Minimum: 0.2 hectares (0.5 acres).
- Additional: 0.1 hectares (0.25 acres) for each extra bird.
- Vertical space: At least 10 meters (33 feet) high.

### **Waterfowl (e.g., ducks):**

- Minimum: 0.1 hectares (0.25 acres).
- Additional: 0.05 hectares (0.125 acres) for each extra bird.
- Vertical space: At least 5 meters (16 feet) high.

## Reptiles-

### **Snakes and lizards:**

- Minimum: 10 square meters (108 square feet).
- Additional: 5 square meters (54 square feet) for each extra animal.
- Vertical space: At least 2 meters (6.5 feet) high.

### **Turtles and crocodiles:**

- Minimum: 20 square meters (216 square feet).
- Additional: 10 square meters (108 square feet) for each extra animal.
- Vertical space: At least 2 meters (6.5 feet) high.



# Management of Livestock in Fringe Areas

## Grazing Management

- Implement rotational grazing to prevent overgrazing.
- Provide supplementary feed to reduce grazing pressure.

## Conflict Mitigation

- Educate farmers on wildlife behavior and coexistence strategies.
- Provide compensation schemes for livestock losses due to wildlife.

## Predator-Proof Enclosures

- Use electric fencing to protect livestock from predators.
- Provide secure night shelters for livestock.

## Disease Control

- Implement biosecurity measures to prevent disease.
- Regularly vaccinate livestock

# Feeding Habits, and Feeding Schedules of Captive Animals

Captive Animals	Feeding Habits	Feeding Schedule
• <b>Carnivores</b>	meat (high-protein diet)	•Feed once or twice daily based on size
• <b>Herbivores</b>	plants (leaves,grasses,browse)	•Provide hay ad libitum; once or twice daily.
• <b>Omnivores</b>	both plants and meat	•Feed once or twice daily

# Restraining method & Capture Techniques

## Restraint Methods

### Chemical Restraint:

- Use of sedatives/anesthetics via injection or dart for large animals.

### Physical Restraint:

- Use of squeeze cages or manual methods for smaller animals.

## Capture Techniques

### Traps:

- Box traps, net traps

### Darting:

- Use of dart guns

### Netting:

- Surround smaller animals with nets



# Classification of Zoos

1•Urban Zoos

2•SuburbanZooss

3•Safari Parks

4•Specialized Zoos:

- Aquariums
- Aviaries/Bird Parks
- Species-Specific Zoos

# Conservation Projects

•Project Tiger:

•Project Elephant:

•Project Snow Leopard:

•*Approximately 4.89% of India's land area is designated as wildlife conservation zones.*

- **Wildlife Protection Act, 1972:** Legal framework for protecting wildlife and captive animals.
- **Prevention of Cruelty to Animals Act, 1960:** Prevents unnecessary suffering of animals in captivity.
- **Performing Animals (Registration) Rules, 1973:** Regulates the use of animals for entertainment.

## National Organizations

- *Central Zoo Authority (CZA):* Zoo management in India.
- *Animal Welfare Board of India (AWBI):* Promotes animal welfare under the Prevention of Cruelty to Animals Act.

## International Organizations

- *World Association of Zoos and Aquariums (WAZA):* Global alliance for zoos and aquariums.
- *International Union for Conservation of Nature (IUCN):* Focuses on conservation, including captive breeding programs.



# **UNIT-5**

## **ANIMAL WELFARE**



**Animal Welfare:** Refers to the physical and mental well-being of animals, influenced by living conditions, nutrition, and veterinary care.

**Key Components:**

- Physical health
- Mental well-being
- Environmental enrichment

**Animal Ethics:** Examines moral considerations regarding how animals should be treated by humans.

## **Animal Welfare Organizations**

- **World Organisation for Animal Health(OIE):** Sets international standards for animal health and welfare.
- **American Veterinary Medical Association(AVMA):** Develops animal welfare policies and resources.
- **Animal Welfare Board of India(AWBI):** Advises the government, promotes education, and provides grants for animal welfare initiatives.

## **Rules, Regulations, and Laws on Animal Welfare**

- **Prevention of Cruelty to Animals Act, 1960(India):** Prohibits unnecessary pain.
- **Animal Welfare Act, 1966 (USA):** Sets standards for care in research, exhibition, transport, and breeding.
- **European Union Legislation:** Protects farm animals, laboratory animals, and pets through various

## ***Role and Function of CPCSEA***

**Established under the PCA Act in 2002 to oversee animal experimentation.**

- **Functions:**
- **Approves research proposals**
- **Promotes alternatives to animal testing.**
- **Provides training for researchers on ethical practices.**

## ***Protection of Wildlife in Nature and Captivity***

- **To maintain biodiversity and ecosystem balance.**
- **Wildlife Protection Act, 1972:** Protects wild animals and plants
- **CITES:** Regulates international trade in endangered species.

## **Protection and Welfare of Performing Animals**

- **PCA Act prohibits cruel training practices;**

## ***Welfare of Animals During Transportation***

- **Transportation can cause stress and injury.**
- **Guidelines for Transportation:**
- **Adequate space, ventilation, food, and water during transport.**
- **Minimize travel time to reduce stress.**



## **Protection and Welfare of Working Animals-**

- Working animals (**horses, donkeys**) are essential in agriculture and transportation.

### **Welfare Concerns:**

- Overwork, and poor nutrition.
- Lack of veterinary care.

### **Best Practices:**

- Provide adequate rest, nutrition, and veterinary care.
- Train handlers to recognize signs of injury.

## **Animal Welfare During Natural Calamities-**

- Natural disasters pose significant risks to animal welfare.

### **Challenges Faced by Animals:**

- Displacement leads to loss of shelter and food sources.
- Increased vulnerability to injuries and disease outbreaks.

### **Disaster Management Strategies:**

- Develop emergency response plans that include animal care.
- Collaborate with authorities for disaster preparedness.

## **Livestock Importation Act-**

- Regulates the import of livestock to prevent disease introduction.

### **Key Provisions:**

- Health Certification
- Quarantine Requirements
- Inspections:

## **Code of Conduct and Ethics for Veterinarians-**

- Outlines ethical responsibilities and professional standards for veterinarians.

### **Professional Behavior:**

- Treat clients with respect and communicate treatment options clearly.
- Avoid conflicts of interest and disclose potential biases.

### **Reporting Obligations:**

- Duty to report suspected animal cruelty or unethical practices.

## **Evidence in Veterinary Practice:**

- Maintain accurate medical records for all patients.
- Documentation is crucial for legal disputes and investigations.

## **Liability:**

- Veterinarians can be liable for malpractice due to negligence or breach of duty.

## **Insurance Considerations:**

- Professional liability insurance protects against claims related to malpractice.

## **Role of Veterinarians in Animal Welfare**

- **Clinical Care**
- **Advocacy:** Support humane treatment policies and legislation.
- **Education:** Inform pet owners and conduct outreach programs.
- **Research**
- **Policy Development:** Collaborate on guidelines to enhance animal welfare.



# UNIT-6

## (POULTRY PRODUCTION MANAGEMENT)



- **Broilers:** Raised for meat production, weight range of 2.4 to 2.6 kg.
- **Layers:** Raised for egg production, laying 310 to 340 eggs per year.
- **Backyard Poultry:** Small-scale farming that contributes to family nutrition and income, particularly in rural areas.

- **Major egg-producing states :**
- Andhra Pradesh (20.13%)
- Tamil Nadu (15.58%)
- Telangana (12.77%)
- West Bengal (9.93%)
- Karnataka (6.51%)

### • **Production Figures:**

- Total egg production in India approximately 138.38 billion eggs during 2022-23.
- Poultry meat production was over 4.78 million tons in recent years.
- The poultry population in India was estimated at over 800 million.

**Market Value:** The Indian poultry market was valued at approximately ₹1,750 billion in 2018 and is projected to reach ₹4,340 billion by 2024, growing at a CAGR of 16.2%.



- **Chicks:** Newly hatched birds up to six weeks old.
- **Pullets:** Young female chickens before they start laying eggs (between six weeks and six months).
- **Cocks/Roosters:** Mature male chickens used for breeding or meat.

## **Strains for Rural Poultry Production**

- **Kuroiler Chicken:** High egg production.
- **Red Ranger:** Rapid growth; good meat quality.
- **Indigenous Ducks:** High egg production; resilient.

**Ducks-** Raised for meat & egg production, high egg yield (Khaki Campbell).

**Turkeys-** Raised for their meat

**Quail-** High nutritional value of quail eggs and meat.

- have a short production cycle and raised in smaller spaces compared to traditional poultry.

**Guinea Fowl:** Raised for meat and pest control, consume insects and rodents.



# Brooding Management

Brooding is process of the successful rearing of chicks.

Types of brooders-

1. **Conventional Hover Brooder:** Provides warmth from above.
2. **Pancake Brooder:** Uses convective heat to warm the air around the chicks
3. **Electric Lamp Brooder:** Provides infrared heat using electric lamps.
4. **Radiant Brooder:** Directly warms chicks with infrared radiation.
5. **Natural Brooding:** A broody hen can be an effective method for small-scale farmers

**Preparation of the brooding shed :**

- **Disinfection:** Clean the brooding area thoroughly before introducing chicks
- **Temperature Control:** Around 95°F initially, Gradually reduce about 5°F each week as chicks grow older.
- **Litter Management:** Use dry, clean bedding materials such as straw or wood.
- **Water and Feed Accessibility**

## **Housing Types-**

- 1. Floor Houses:** Natural behaviors but need sanitation.
- 2. Cage Systems:** Easier management but restrict movement.
- 3. Free-range Systems:** Outdoor access; better welfare.
- 4. Deep Litter Systems:** Absorbs waste; provides insulation.

## **Space Requirements-**

- **Brooders:** 1 sq ft per chick initially.
- **Adults:** 2 to 4 sq ft per bird.

## **Recent Advances in Housing Systems-**

- 1. Environmental Control Systems:** Automated climate regulation.
- 2. Modular Housing Designs:** Flexible space adjustments.
- 3. Sustainable Materials:** Eco-friendly construction options.
- 4. Integrated Pest Management (IPM)**

## **Rearing Systems**

- **Biosecurity Measures:** Prevent disease outbreaks effectively.
- **Integrated Feeding Systems:** Optimize feed efficiency and reduce waste.

## Scavenging System of Management-

low-input technologies

- **Backyard Units:** Small flocks, free-range foraging.
- **Semi-Intensive Units:** Both scavenging and supplemental feeding.

### **Economic Achievements-**

- Cost Savings & Reduces dependency on commercial feeds.

## Deep Litter Management-

Maintain a dry & clean environment for birds, use bedding materials like straw or wood shavings to absorb moisture and droppings, which helps control litter-borne diseases.

### **Recycling of Litter**

- Used as organic fertilizer, enhancing sustainability and reducing waste

## Cage Management-

### **Types of Cage Systems**

1. **Battery Cages:** High-density, multi-tiered housing.
2. **Enriched Cages:** More space with nesting boxes and perches.
3. **Floor Cages:** Limited movement but more space than battery cages.

### **Advantages of Cage Systems**

- **Hygiene:** Reduced disease incidence from droppings.
- **Management Efficiency:** Easier health monitoring and egg collection.
- **Higher Production Rate**

### **Disadvantages of Cage Systems**

- Limited space may cause stress.
- High setup costs for small-scale farmers.



# Management of Growers & Layers-

## **Growers-**

- **Housing:** Adequate space, ventilation, and lighting.
- **Feeding:** Balanced diet tailored to growth stage.
- **Health Monitoring:** Regular checks and vaccination.

## **Layers-**

- **Lighting Management:** To stimulate egg production.
- **Nutritional Requirements:** High calcium and phosphorus diet.
- **Regular Egg Collection**

# Management of Broilers & Breeders

## **Broilers**

- **Growth Monitoring:** Regular weighing and feed adjustment.
- **Feeding Systems:** Phase feeding for optimal efficiency.
- **Biosecurity Measures:** Strict protocols to prevent diseases.

## **Breeders**

- **Flock Separation:** Males and females after 28 days.
- **Feed Management:** Ad libitum to controlled based on weight.
- **Environmental Conditions:** Temperature, humidity, and ventilation control.

## Breeding Systems and Methods of Mating

- **Pen Mating:** 10 hens with 1 cock, eggs fertile 1 week after introduction.
- **Flock Mating:** Large flock with multiple cocks, cocks may fight.
- **Stud Mating:** Cocks and hens in separate pens, hens mated individually.
- **Alternate Males:** Two males used alternately, each serving hens for 1 day.

## Selection and Culling:-

- Selection based on desired traits like growth, egg production, disease resistance.
- Regular culling of underperformers to maintain flock productivity

## Breeding for Specific Characters and Hybrids

- **Selective breeding** to enhance desirable traits.
- **Crossbreeding** to produce hybrid chickens with hybrid vigor.

## **Poultry Judging**

- Evaluation of live birds or carcasses based on breed standards and production traits.
- Criteria include conformation, feathering, skin color, egg production, feed efficiency.

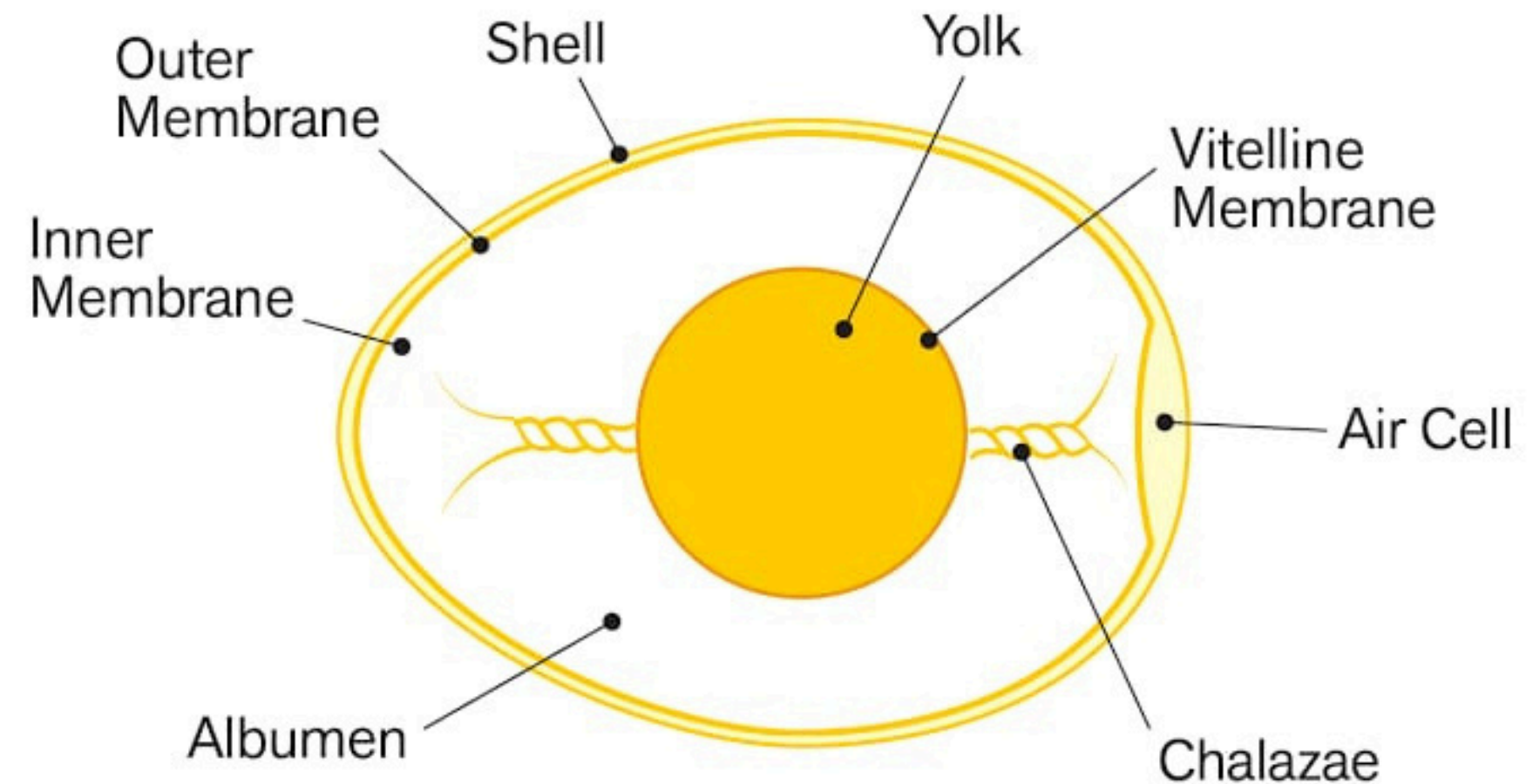
# Egg Structure & Composition

## **Physical:**

- Shell
- Membranes
- Albumen
- Yolk

## **Chemical:**

- 12% lipids,
- 12% proteins
- Water
- Carbohydrates
- Minerals
- Vitamin.





# **UNIT-7**

## **(DIVERSIFIED POULTRY PRODUCTION AND HATCHERY MANAGEMENT)**



## 1. Principles of Incubation

- **Temperature Control:** Maintain 37.5°C to 38.5°C (99.5°F to 101.5°F).
- **Humidity Regulation:**
  - 50-60% during incubation.
  - Increase to 70% during hatching.
- **Airflow:** Ensure adequate ventilation for oxygen supply and CO<sub>2</sub> removal.
- **Turning Eggs:** Turn eggs at least three times a day to prevent sticking.

## 2. Hatchery Management Practices

- **Selection of Hatching Eggs:** Use clean, intact eggs; avoid dirty or damaged eggs.
- **Storage Conditions:** Store eggs at 18°C (64°F) and 75% humidity, pointy end down.
- **Candling:** Check for fertility and embryo development around days 7 and 18.

## Factors Affecting Fertility and Hatchability

- **Genetic Factors:** Breeding stock genetics influence egg quality.
- **Nutritional Factors:** Proper nutrition is crucial for breeding hens.
- **Environmental Factors:** Temperature, humidity & light exposure .
- **Hatchery Hygiene:** Sanitation ,Disinfection,Pest Control.

## Care of Hatching Eggs

- **Handling:** Handle eggs gently to avoid damage.
- **Temperature management:** Avoid extreme temperatures before incubation.
- **Monitoring Conditions:** Regularly check storage temperature and humidity.

## Candling, Sexing, Grading, Packing

- **Candling:** Assess egg fertility and embryo development.
- **Sexing:** Identify male vs. female chicks using various methods.
- **Grading:** Grade chicks based on health, size, and appearance.
- **Packing:** Use ventilated packing materials; avoid overcrowding.



## Economics of Hatchery Business-

- **Cost Analysis:**

- **Fixed Costs:** Infrastructure, equipment, utilities.

- **Variable Costs:** Labor, feed, vet care.

- **Revenue Streams:**

- Sale of day-old chicks.

- Value-added products (organic chicks, specialty breeds).

- **Profitability Factors:**

- Efficient management to maximize hatchability.

- Market demand for poultry products.

- **Financial Planning:**

- Budgeting for operational costs and investments.

- Income forecasting based on production capacity.

## Troubleshooting Hatchery Failures

- **Temperature Fluctuations:** Monitor incubators; use backup systems.

- **Humidity Issues:** Calibrate sensors; adjust water levels.

- **Poor Egg Quality:** Assess breeding stock; improve nutrition.

- **Inadequate Ventilation:** Check airflow systems regularly.

- **Contamination:** Maintain biosecurity; sanitize equipment.

## Computer Applications in Hatchery Management-

- **Data Management Systems:** Track inventory & incubation parameters.
- **Monitoring Systems:** Use devices for real-time monitoring.
- **Decision Support Systems:** Analyze data trends for informed decisions.
- **Record Keeping**

## Poultry Waste Management-

- **Composting:** Converts waste into nutrient rich compost.
- **Anaerobic Digestion:** Produces biogas and fertilizer from waste.
- **Incineration:** Reduces waste volume and eliminates pathogens.

## Pollution and Environmental Issues

- **Water Pollution:** cause eutrophication in waterways.
- **Air Quality Concerns:** Emissions of ammonia and methane from waste.
- **Soil Health Impact:** Overapplication of litter can degrade soil quality.

# Export and Import of Poultry Produce

## Exporting Poultry Products-

- **Registration:** Exporters must register with authorities for compliance.
- **Legislation Compliance:** Adhere to local and international food safety standards.
- **Destination Requirements:** Meet specific Overseas Market Access Requirements (OMARs).
- **Border Clearance:** Undergo inspections and certifications for exported products.

## Importing Poultry Products-

- **Regulatory Framework:** Governed by national laws to prevent disease introduction.
- **Sanitary Import Permits (SIPs):** Required to ensure sanitary standards are met.
- **Quarantine Procedures:** Imported products must go through quarantine at ports.



## Marketing of Poultry Products

- Direct Sales
- Retail Outlets
- Wholesale Distribution
- Food Service Industry

## Challenges in Poultry Marketing

- Price Fluctuations: .
- Competition
- Regulatory Compliance

## Mixed or Integrated Poultry Farming

**Combining poultry production with other agricultural activities.**

- **Integration with Crops:**

- Poultry waste as organic fertilizer for crops.
- Crop residues as feed for poultry.

- **Livestock Integration:**

- Raising poultry alongside other livestock for diversified income.

- **Benefits:**

- Increased farm productivity and sustainability.
- Reduced reliance on external inputs.





# **UNIT-8**

## **(LABORATORY OR RABBIT OR PET ANIMAL PRODUCTION MANAGEMENT)**



## Importance of Laboratory Animals

- **Research Models:** Used to study human diseases and biological processes.
- **Testing Safety:** Essential for testing drugs, vaccines, and medical devices before human trials.
- **Education:** Important for teaching anatomy, physiology, and surgical techniques in veterinary and medical education.

## Selection Criteria

- **Species Choice:** Depends on research objectives (e.g., mice, rats).
- **Genetic Background:** Prefer genetically homogeneous strains to reduce variability.
- **Health Status:** Use specific-pathogen-free (SPF) animals for reliable results.
- **Age and Sex:** Consider age and sex as they influence physiological responses.



## Housing Standards

### Space Requirements:

- **Mice:** Minimum 15 cm<sup>2</sup> per mouse.
- **Rats:** Minimum 30 cm<sup>2</sup> per rat.
- **Guinea pigs:** Minimum 100 cm<sup>2</sup> per guinea pig.

### Environmental Conditions:

- **Temperature:** 20-26°C for most rodents.
- **Humidity:** 30% to 70%.
- **Lighting:** 12-hour light/dark cycle.

## Nutritional Requirements

- Balanced diets with proteins, carbohydrates, fats, vitamins & minerals.
- **Mice:** ~14-20% protein.
- **Rats:** ~20% protein.
- **Guinea pigs:** High-fiber diet rich in vitamin C.

## Breeding Considerations-

- Ensure genetic diversity while maintaining desired traits.
- Provide balanced diets during gestation for pregnant females.

# Specific Pathogen-Free (SPF) & Germ free laboratory Animals

Animals free from a defined list of specific pathogens.

- Facility Requirements:
- Positive pressure systems to prevent pathogen entry.
- Quarantine protocols for new animals.
- Sterilization procedures

- Germ-Free Animals:  
Completely devoid of all microbes.

## Breeds -

- **New Zealand White:** *Fast growth, good meat quality.*
- **California Rabbit:** *Popular for meat; white body with black markings.*
- **Himalayan Rabbit:** *Adapted to colder climates; valued for meat and fur.*
- **Angora Rabbit:** *Raised primarily for wool production.*

## Importance of Rabbit Farming

- **Nutritional Value:** High protein, low-fat meat source.
- **Economic Potential:** Low investment cost with quick reproduction rates.

# Limitations of Rabbit Animal Production

1. **Health Issues:** Susceptible to diseases like myxomatosis.
2. **Market Demand**
3. **Management Challenges:** Requires proper housing and nutrition.
4. **Breeding Practices:** Risk of genetic problems from inbreeding.

## Selection Criteria

- **Genetic Quality:**
- **Physical Condition:** Select healthy animals free from deformities.

# Care Management

1. **Housing:** Adequate space with ventilation and predator protection.
2. **Nutrition:** Balanced diet including hay, pellets, and fresh vegetables.
3. **Breeding Management:**
  - Monitor breeding cycles for optimal litter size.
  - Provide nesting boxes for does.
4. **Health Monitoring:**
  - Regular health checks and vaccinations.



# Kindling in Rabbits

Process of giving birth in rabbits.

- Gestation period ~30-32 days.

## Signs of Kindling:

- Nesting behavior
- Increased restlessness & agitation.
- Loss of appetite

## Care During Kindling

- Provide a clean, safe nesting area with proper bedding materials (hay or straw).
- Ensure the doe is healthy and well-fed prior to kindling.

# Post-Kindling Care:

- Monitor for complications during birth.
- Ensure kits are nursing within hours.
- Keep the nesting area clean and dry.

## Newborn Care-

- Check kits for health; they should be warm and nursing.
- Keep newborns warm as they cannot regulate body temperature.
- Wean kits at 4-6 weeks; introduce solid food gradually.

## **Breeding Techniques-**

- **Natural breeding or artificial insemination**
- **Breeding Age: Does at 6 months; bucks at one year.**

## **Selection Techniques-**

- **Genetic Selection:** Choose breeding stock based on desirable traits.
- **Record Keeping:** Maintain records of breeding dates and performance.

## **Housing Requirements-**

- **Space Needs:** Minimum 12 square feet per rabbit; provide exercise space.
- **Cage Design:** Use wire cages or hutches with good ventilation.

## **Hygiene Practices-**

- **Regular Cleaning:** Clean cages weekly; remove waste daily.
- **Pest Control:** Implement measures to prevent infestations.

# **Project Planning**

## **1. Micro (Backyard) Farms:**

- **Minimal investment; focus on a few breeding pairs.**

## **2. Mini Farms:**

- **Moderate investment; multiple breeding pairs with enhanced facilities.**

## **3. Major Farms:**



- **Large-scale production requiring significant investment in infrastructure.**





## UNIT-9

(SWINE/ EQUINE/ CAMEL / YAK  
AND MITHUN PRODUCTION  
MANAGEMENT)





# Scope of Swine Farming in India-

- **Economic Importance:** High profitability and rising interest among farmers due to demand for pork.
- **Market Demand:** Increasing urbanization and dietary changes lead to higher pork consumption.
- **Government Initiatives:** Like the *Pig Development Scheme* promote commercial pig farming.
- **Growth Potential:** Viable in regions with high meat consumption, especially in the North Eastern states.

## Swine Population-

- *Approximately 10.29 million pigs in India.*
- *North Eastern Region holds 38.42% of the population.*
- *Assam has the highest population at 1.63 million pigs.*





## Breeding Techniques-

1. **Natural Mating:** *Traditional method* where selected boars mate with sows.
2. **Artificial Insemination (AI):** *Modern technique* for improving genetic diversity.

## Selection Criteria-

- **Gilts:** Strong legs, minimum of 12 functional teats, good body conformation.
- **Boars:** Selected based on growth rates and reproductive performance.

## Exotic Breeds

1. **Yorkshire:** White; high fertility and growth performance; raised for meat.
2. **Landrace:** Drooping ears; excellent mothering ability; high-quality pork.
3. **Duroc:** Reddish-brown; good meat quality; used in crossbreeding.

## Indigenous Breeds

1. **Desi Pig:** Adaptable to local conditions; smaller size.
2. **Bihar Local:** Strong bristles; well adapted to poor feeding conditions; lower production potential.



# HOUSING REQUIREMENTS

- **Flooring:** Solid, impervious, sloped for drainage.

## Space Allocations:

- **Fattening pigs:** 0.5 - 1.0 sqm per pig.
- **Pregnant sows:** 1.5 - 2.0 sqm per sow.
- **Lactating sows:** 4 - 6 sqm per sow.
- **Weaner piglets:** 0.3 – 0.5 sqm per piglet.
- **Breeding boars:** 6 - 8 sqm per boar.

## Environmental Conditions:

- Adequate ventilation to prevent respiratory issues.
- Protection from extreme weather conditions.

## Types of Housing:

- **Open or Loose Housing:** Allows free movement; (for smallholders).
- **Closed Housing:** Better control over environmental conditions; used in intensive farming.



# FEEDING PRACTICES

## Nutritional Requirements:

- Balanced diet with carbohydrates, proteins, vitamins, and minerals.

## Types of Rations:

- **Creep Ration:** For piglets (7-10 days old).
- **Starter Ration:** From weaning (22 days) to two months.
- **Grower Ration:** From two months to five months.
- **Finisher Ration:** From five months to market weight.

## Breeding and Pregnant Sows:

- Provide a quiet environment; monitor body condition and adjust feeding.

## Sows at Farrowing:

- *Use farrowing crates;* ensure cleanliness and adequate bedding.

## Piglets:

- Monitor health closely; *wean at around 4-6 weeks.*

## Growing Stock:

- Provide adequate space; *feed a balanced diet for growth.*

## Lactating Sows:

- Increase feed intake to meet milk production demands.



# EQUINE POPULATION OF INDIA

## Horses

- Used for riding, racing, and agricultural work.
- Breeds include *thoroughbreds (racing)* and *indigenous breeds (Marwari, Kathiawari)*.

## Donkeys

- used for *carrying heavy loads and agricultural tasks*.

## Mules

- Crossbreeds between male donkeys and female horses*; known for strength and endurance.
- Used in hilly terrains for work and transportation.

## Utility of Equines

- 1.Transportation:** Essential for moving goods in rural areas.
- 2.Agricultural Work:** Used for plowing fields and carrying loads.
- 3.Recreation and Sports:** Horses participate in various sports (*polo, racing*).



## Colors and Markings of Horses

**Colors:** *Bay, chestnut, black, gray, palomino,*

**Markings:**

- **Blaze:** Wide stripe down the *face*.
- **Star:** Small white mark on the *forehead*.
- **Snip:** Small white mark on the *muzzle*.
- **Sock:** White markings on the *legs*.
- **Pinto:** *Large patches of white and another color.*

## Types of Breeds of Horses

- **Light Breeds:** For riding and racing (e.g., *Thoroughbred, Arabian*).
- **Heavy Breeds:** For draft work (e.g., *Clydesdale, Percheron*).
- **Ponies:** Small horses under 14.2 hands (e.g., *Shetland, Welsh*).



## DENTITION AND AGEING OF HORSES

- **Dental Structure:** Incisors for cutting and molars for grinding.

### **Age Determination:**

- Examine teeth for temporary vs. permanent teeth.
- Assess wear patterns and cups in incisors.
- Accurate aging generally possible until about 10 years.

## Care and Routine Management of Equines

### **Grooming**

- Essential for coat health.
- **Tools include curry combs, brushes, and hoof picks.**

### **Saddling**

- Ensure proper saddle fit and use a saddle pad for comfort.

### **Exercise**

- Regular exercise is vital for physical health and mental well-being.
- Types include riding, ground work, and turnout.

# *Stable Management*

## **Stable Design-**

- Safety features like *robust construction and non-slip flooring*.
- Adequate ventilation

## **Bedding Options**

- Straw (warmth), wood shavings (absorb moisture), paper bedding (low dust).

## **Mucking Out**

- *Regular removal of droppings/urine is crucial.*
- *Methods include full muck-out or deep litter system.*

## **Enrichment**

- Provide forage feeding methods (hay nets) and interactive toys to stimulate mental engagement.



## *Vices of Horses*

- **Cribbing:** Biting or gripping surfaces,
- **Weaving:** Swaying back and forth due to stress or boredom.
- **Pawing:** Digging at the ground.
- **Bolting Feed:** Eating too quickly, risking choking or colic.
- **Biting/Kicking:** Aggressive behaviors stemming from fear or discomfort.

## *Foot Care and Shoeing Care*

**Hoof Trimming:** Every 6 to 8 weeks to maintain hoof health.

Shoeing Types:

- **Steel Shoes:** Common for general use.
- **Aluminum Shoes:** Lighter for performance horses.
- **Therapeutic Shoes:** For specific hoof issues.
- **Hoof Health Monitoring:** Check for thrush, cracks, and infections.



# *Feeding Routine for Horses, Donkeys, and Mules*

**General Guidelines:** 1.5% to 2% of body weight in forage daily.

## **Nutritional Requirements:**

- Forage as the primary diet (hay, pasture).
- Small amounts of concentrates (grains) as needed.
- Supplements for vitamins and minerals if necessary.

**Feeding Schedule:** Multiple small meals throughout the day.





## Care of Stallions

- **Health Monitoring:** Regular veterinary check-ups for reproductive health.
- **Nutrition:** Balanced diet rich in energy and protein during breeding seasons.
- **Handling:** Proper training is crucial due to potential aggression.

## Mating of Horses

- **Natural Mating:** Stallions mate with mares.
- **Hand Mating:** Supervised mating process.
- **Artificial Insemination (AI):** Semen collected & introduced into mare.

## Brood Mare and Its Care

- **Nutrition:** Increased caloric intake during pregnancy and lactation.
- **Exercise:** Regular exercise without overexertion during pregnancy.
- **Veterinary Care:** Routine vaccinations & deworming before breeding.





# Foaling and Care of Newborns

## Foaling Stages:

- **Stage 1 (Preparation):** Lasts 1–4 hours; signs include restlessness.
- **Stage 2 (Delivery):** Actual birth occurs within 5–15 minutes.
- **Stage 3 (Postpartum):** Passage of placenta should occur within 3 hours.

## Postnatal Care:

- Ensure foal nurses within the first few hours for colostrum intake.
- Monitor foal behavior standing within 2 hours, nursing within 3 hours.

## Breeding Mules

- Mules are hybrids (*male donkey x female horse*); generally sterile.





## Care of Race Horses

- **Training Regimen:** Structured training focusing on stamina and speed.
- **Nutrition:** High-energy diets tailored to training intensity.
- **Health Monitoring:** Regular veterinary check-ups to prevent injuries.

## Preparing Horses for Shows

- **Training:** Consistent routines focusing on discipline-specific skills.
- **Grooming:** Enhances appearance and helps identify skin issues early.
- **Feeding Adjustments:** Increase energy intake leading up to competitions.

## Doping and Its Detection

- Awareness of banned substances is crucial; testing protocols exist at competitions.





The background of the slide is a detailed historical painting of a harbor, likely the Golden Horn in Istanbul. It shows numerous sailing ships with white sails and red hulls, as well as smaller rowing boats. In the distance, a city with domed buildings and minarets is visible on a hillside under a cloudy sky. The title 'Colic and Its Prevention' is centered at the top in a brown rounded rectangle.

# *Colic and Its Prevention*

## **1. Feeding Practices:**

- Provide adequate forage; avoid sudden diet changes.

## **2. Hydration:**

- Ensure constant access to clean water.

## **3. Regular Exercise:**

- Promote movement through turnout or exercise routines.

## **4. Monitoring Behavior:**

- Watch for signs of distress or changes in eating habits



# Common Breeds of Camel in India and Their Utility

1. **Bikaneri Camel:** Multi-purpose; used for riding, packing, and milk production.
2. **Jaisalmeri Camel:** Primarily for riding and racing.
3. **Sindhi Camel:** *Known for milk production* and as a pack animal.
4. **Marwari Camel:** Used *mainly for transport*; heavy with long legs.
5. **Mewari Camel:** Adapted for milk production and baggage.
6. **Kutchi Camel:** Companion animal or for *fancy purposes*.
7. **Jalori Camel:** *Crossbred between Marwari and Jaisalmeri*; used for transport.
8. **Shekawati Camel:** Useful for loading, riding, and farm operations.





## **Peculiarities in Camels-**

- Adapted to arid environments; can withstand extreme temperatures.
- Survive long periods without water, using fat in their humps as energy.
- Features like thick foot pads and closing nostrils help prevent sand inhalation.

## **Feeding Schedule of Camels-**

- Diet primarily consists of forage (hay, pasture).
- Typical feeding routine:
- Morning: Forage or hay
- Afternoon: Grains or supplements
- Evening: More forage or grazing access
- Ensure constant access to clean water.

## **Rutting Symptoms in Camels**

- Loss of hair
- Decreased appetite and weight loss
- Increased aggression and vocalizations
- Protrusion of the soft palate when excited



## Care of Breeding in Camels

### Pregnancy Care

- Increased caloric intake (by about 25%).
- Regular veterinary check-ups.

### Parturition (Foaling)

- Gestation period is around 12–14 months; typically gives birth while sitting down.
- Ensure foal nurses within the first few hours for colostrum intake.

### Vices of Camels

- **Weaving:** Swaying back and forth due to stress.
- **Cribbing:** Biting or gripping surfaces.
- **Kicking/Biting:** Aggressive behaviors from fear or discomfort.
- **Pawing:** Digging at the ground when impatient.





## Population Statistics and Utility of Yaks-

- **Population:** Approximately 16 million domestic yaks globally.

### **Utility:**

- **Milk Production:** Rich in fat and protein.
- **Meat:** Source of food.
- **Transportation:** Used as pack animals.
- **Cultural Significance:** Important to highland communities.

## Peculiarities of Yak

### • **Morphological Adaptations:**

- Thick outer coat and undercoat for insulation.
- Large lungs and hearts for oxygen intake in low-oxygen environments.

### • **Physiological Adaptations:**

- Reduced metabolism to conserve energy.
- Efficient nitrogen utilization during food scarcity.

### • **Behavioral Adaptations:**

- Grazing behavior adapted to select nutrient-rich forbs.





## Feeding of Mithun or Yaks

- **Feeding Schedule:**

- **Morning:** Forage or hay.
- **Afternoon:** Grains or supplements
- **Evening:** Access to grazing or more forage.

- **Nutritional Requirements:**

- Forage as the primary diet component.
- Small amounts of concentrates based on energy needs.
- Supplements for vitamins and minerals as necessary.

## Breeding of Mithun or Yaks

- **Mithun Breeding:**

- *Poly-estrus with estrus cycles every 19 to 24 days.*
- *Puberty age: 27 to 36 months; gestation lasts 270 to 290 days.*


- **Yak Breeding:**

- Year-round breeding with similar gestation periods.
- Selective breeding for genetic diversity.





## **Yak x Cattle Crossing**

- 
- **Hybrids:** Crossbreeding yaks with cattle produces hybrids with beneficial traits.
  - **Adaptation:** Hybrids show resilience to harsh conditions, suitable for high-altitude farming.



## **Milk Composition of Mithun or Yaks**

- **Yak Milk:**
- **Fat content:** 6% to 10%.
- **Protein content:** Exceeds 5%.
- **Mithun Milk:**
- **Fat content:** 8% to 13%.
- **Solid-not-fat content:** 18% to 24%.



THANK  
YOU

