Animal health:

Is the science which search in method of animal care, managements and healthy environment to protect the animals from diseases and to get high protection with less caste.

The air environment:

- Air borne: particles may be solid dust or liquid droplets.
- Dusts: are small solid particles that become dispersed in the air.

The air components:

1- Oxygen O2	20.94
2- ozone	0.02
3- Carbon dioxide Co2	0.028 - 0.04
4- Nitrogen N2	78.4
5- Argonne A2	0.94
6- Hydrogen H2	0.01

Carbon dioxide:

Odorless gas present in normal atmospheric air and it is give by animal themselves and improperly vented and fuel-burning heaters.

Increase the Co2 levels above normal are due to:

1- Poor ventilation.

2- Overcrowding.

3- Poor management.

Method of Co2 measurements:

1- Carbocidometer
2- Haldan portable co2 apparatus.
3- Petlenkofers method.

Microbial pollutants:

1- Bacteria such as Anthrax , Tetanus
2- Fungi such as Aspargillosis.
3- Virus such as Foot and mouth disease, Pox

Measurements of microbial pollutants:

1- Settling plate technique.
2- Bead bubbler device.
3- Air scope device.

Appearance of the healthy animal

You should be able to distinguish between the sick and the healthy animal. Identifying the signs of ill health in livestock will mean that you can:

• Give first aid and treat ill animals quickly

• Prevent the spread of disease to other animals

• Recognise any problems in animals offered for sale

• Recognise any signs of health problems in animals to be used for breeding

Learning objectives

Appearance of the animal

The healthy animal is alert and aware of its surroundings. It is active and holds its head up watching what is happening around it. It should stand on all of its feet. The separation of an animal from the others in its group is often a sign of a health problem.

An animal which is not interested in its surroundings and does not want to move has health problems.

Movement (gait)

- The healthy animal will walk easily and steadily with all of its feet taking its weight.
- Steps should be regular. Irregular movement results from pain in the feet or limbs.
- Horses normally stand during the day. If you go near an animal that is lying down it should stand up quickly otherwise it has health problems.

Eyes

The eyes should be bright and alert with no discharge at the corners.

Ears

- Most animals have erect ears which move in the direction of any sound. Ear movements will also be quick to get rid of flies,

Nose and Muzzle

- The nose should be clean with no discharge.
- In cattle and buffalo the muzzle should be moist not dry.
- In sheep and goats the nose should be cool and dry.
- Healthy animals frequently lick their noses with their tongues.

Mouth

There should be no saliva dripping from the mouth. If chewing is slow or incomplete there must be a problem with the teeth.

The coat

- In short-haired animals, e.g. goat and cattle, the hair or coat of the healthy animal will be smooth and shiny.
- Healthy cattle, buffalo and their calves lick their coat and the lick marks will show.
- Horses should not sweat when resting.
- In poultry the feathers should be smooth and glossy and not ruffled.

Behaviour

If a horse, cow or buffalo keeps looking at its flanks or kicks at its belly it has a pain in the stomach.

Breathing

Breathing should be smooth and regular at rest. Remember that movement and hot weather will increase the rate of breathing. If the animal is resting in the shade it should be difficult to notice the chest moving as it breathes.

Pulse

Taking the pulse is important when examining an animal. In man the pulse can be easily taken but in animals it is more difficult and requires practice.

• In sheep and goats you can feel the pulse on the inside of the top of the back leg.

The rate of the pulse is 70 - 130 per minute in the adult.

• The pulse of cattle is taken at a point on the underside of the base of the tail, **the normal rate is 40 - 80 per minute in the adult**.

• The pulse of the horse is taken on the inside of the cheek. The normal rate is 35 - 40 per minute.

• The pulse of the camel is taken at a point on the underside of the root of the tail.

The normal rate is 35 - 45 beats per minute.

Remember that the pulse will be higher in the young animal. To take the pulse you should feel for it with the first two fingers of the hand.

Droppings or dung

- The droppings of the healthy animal will be firm. Very soft droppings (diarrhoea) is a sign of ill health. If the animal has difficulty in defecating (constipation) this is also a bad health sign.

Urine

- The urine should be clear and the animal show no signs of pain or difficulty in urinating.
- Horses, mules and donkeys can have thick yellow urine which is normal.

Appetite and rumination

- The animal should eat and drink normally. Failure to eat is an obvious sign of ill health. If feed is available the healthy animal will have a full belly.
- Sheep, goats, cattle, buffalo and camels chew the cud (ruminate) for 6 to 8 hours each day.

It is a sign of ill health when these animals stop ruminating.

Milk

- In the milking animal a sudden change in the amount of milk produced can mean a health problem.
- Any sign of blood or other matter in the milk points to infection in the udder.
- There should be no swelling of the udder and no sign of pain when it is touched.
- There should be no injury to the teat.

Body temperature

If you suspect that an animal is sick you should take its temperature Taking the temperature may show a higher than normal body temperature which is sign of an infection.

Disinfection

Disinfection: killing or removal of organisume cabable f causing infection.

Factor affect disinfecting:

1- hydration.
2- Time.
3- Temperature.
4- Concentration.
5- PH
6- Chemical antagonism.
7- Surface tension.

Properties of disinfectant:

1- Low cost
2- Safety for man and animal
3- Non corrosive to utensils.
4- Stability in atmosphere.
5- No residual toxicity.
6- Broad spectrum activity.

- **A disinfectant is effective if it is complete elimination of parasite and their reproductive form from environment**.

Sterilization: is the destruction of all forms of life in or on an inanimate object.

Sanitizer: destroy only enough parasite to reduce their level below some regulated standard.

Germicide: is intended to kill all microbes but not bacterial spores.

Bactericide: kill bacteria.

Bacteriostatic: only prevent the multiplication of the bacteria.

Fungicide: kill fungi.

Viricide: kill virus.

Antiseptic: are used to eliminate infection in animal tissue.

Disinfectant: It have :

1- **Mechanical.**

2- **Physical.**

3- **Chemical**.

- Most successful disinfectant method involve two or all three.

1- Mechanical Disinfectant:

It should be mechanical cleaning , an absolutely essential preliminary to either physical , chemical disinfection of animal quarter, blood , feces, pus, and bedding interfere with physical and chemical disinfection reaching the parasite.

Dry cleaning: it means removal of organic matter by means of scoops or scrapers.

Wet cleaning: it refer to scrubbing of surfaces with water or water solution of material such as caustic soda.

2- Physical disinfectant:

It means disinfection in animals environments which include :

1- **Heat.**
2- **Drying.**
3- **Sun radiation.**
4- **Ultraviolet radiation (U.V.).**

3- chemical disinfection:

For chemical disinfection to be effective it must reach and be absorbed by the parasite and then reach and react with the parasites cytoplasmic components.

This reaction includes:

1- **Oxidation:** such as Iodides, Hypochlorite. Potassium permanganate.
2- **Desiccation:** such as Salts.
3- **Reduction:** such as iron salts.
4- **Precipitation:** such as Metallic salts.
5- **Coagulation of cytoplasmic protein:** such as Phenol, cresol, Quaternary ammonium compounds.

- Chlorine, iodine and formaldehyde are effective agent, wide range of bacteria, bacterial spores, virus, fungi but thy are odorous, irritating and corrosive.

- Phenol and cresol: wide affective agents bacteria and their spores and fungi , but their are less affective agents virus.

- Quaternary ammonium compound: are less affective agents virus and gram negative bacteria such as coli form.
- The glycol is most affective as aerosols.
- The alcohols as skin disinfectant.

Formaldehyde fumigation:

Is best disinfection in unoccupied closed houses after mechanical cleaning.

- Formaldehyde gas are the best choice it is produced in practice either by:
  1- aerosolizing or boiling formalin by heating commercial preparation (such as electric frying pan)
  2- Or by reacting potassium permanganate with formalin (at the rate of **620 gram to 1240 ml for each 100 m3)**
    - Formaldehyde fumigation is most effective when used in space at 80% – 90 % relative humidity.

DISEASE TRANSMISSION

Transmission of infections requires three elements:

1. A source of pathogens.
2. A susceptible host.
3. A means of transmission for the microorganism .
    - Sources include animals or environments contaminated by animals.
    - Animals may be clinically ill, asymptomatic carriers of an infectious agent, or harbor endogenous flora.
    - Pathogens may also be transmitted indirectly from objects in the environment including walls, floors, counters, equipment, supplies, animal feed, and water.
    - Transmission is largely influenced by the stability of the

pathogen, the pathogenesis of the disease it causes, and the routes by which it leaves the infected host. Different agents vary in their degree of infectivity through the various routes

Cycle of infection:

1. **entrance**
    - parasite gets in and establishes itself
    - parasite usually have to penetrate some barrier
    - most commonly enter through mucous membranes (except wound and vector-borne parasites)

2. **multiplication**
    - replication of parasite
    - parasite often causes damage to host
    - host defenses aim to limit replication

- **exit -** new population to enter new host
- **transmission -** mechanism to find a new host
    - **horizontal transmission :**

      Infected host to uninfected host (most pathogens)
    - **vertical transmission :**

      Passed from mother to offspring (venereal diseases, *Salmonella*)

Methods of parasite transmission

1. **Direct**
    - **venereal – (sexual contact)**
        - *Brucella* in cattle and dogs
        - *Vibrio* abortions in sheep

- **aerosol**
  - influenza
- **fecal/oral contact**
  - *Salmonella*
  - Leptospirosis in calves

- **fomites : inanimate objects involved in transmission**
  - **surgical instruments**
  - **boots**
  - **needles**
  - **watering troughs**

2. Indirect - vector transmission:

(such as mosquitoes, fleas, ticks, rats, and other animals**)**

- **vector :** living organism that transmits disease
- **mechanical vector :** living organism physically contaminated with parasite

Example:

- **Lyme disease – ticks.**
- **Black Death (plague) -fleas**

External parasites of ruminants

- *Ruminants can be infected by several parasites of the skin (external parasites) which feed on the animal's skin and blood.*
- *The parasites cause disease, loss of weight, and can lead to death of the animal.*

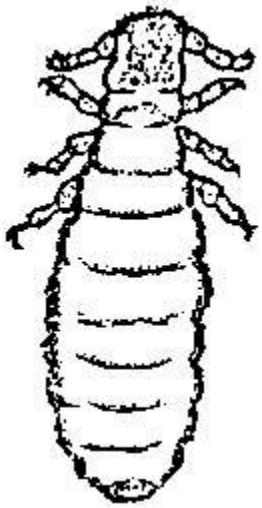
- *The parasites can also carry other infections and spread diseases from one animal to another. Some of these diseases can kill.*

The parasites

- All animals and man can be hosts to parasites which live on the skin. These parasites look like insects.

- Mites are very small and cannot be seen without a microscope. They live and lay their eggs on the skin.
- Lice (singular is louse) are big enough for you to see. Man can be infected with the head louse. Cattle, buffalo, sheep and goats can be infected with different lice which attack the body, legs or tail region. Lice live and lay their eggs on the skin amongst the hair or wool.

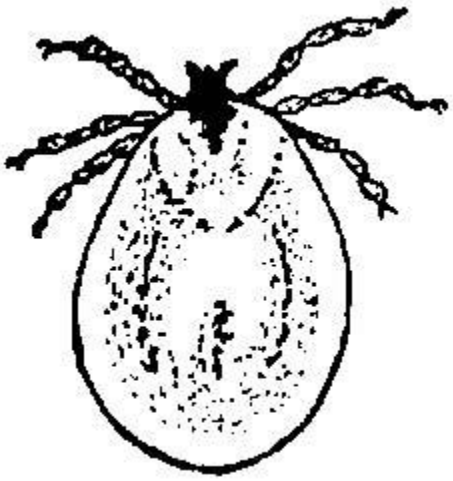
Lice



- Ticks are bigger than lice and can be as big as a fingernail. Young ticks have 6 legs while adults have 8 legs. All ticks feed on the blood of the host and then drop off onto the pasture. They lay their

eggs on the ground. Some ticks live on one host while others may live on two or three different animals throughout their lives

Tick



Problems caused by external parasites

1. Mites cause mange. They infect the head, legs, body or tail region causing the skin to become crusted and cause loss of hair and wool.
2. The infected area itches and the animal scratches.
3. The host does not feed well.
4. The infections cause loss of valuable wool in sheep and damage hides of cattle and goats.
5. Sometimes young animals become infected with a skin disease called ringworm. Ringworm causes circular, whitish patches on the skin which do not itch..

Ringworm

6. Lice also cause irritation of the skin and the animal scratches, rubs and bites the infected areas.

7. The host loses, or does not gain weight, and looks in poor condition.

8. Both lice and mites can pass from one animal to another.

9. Biting and scratching are the first signs of infection.

Treatment and control

1. Mites and lice are controlled by washing the infected area, spraying or dipping the animal with a suitable treatment.

2. All of the flock or herd must be treated to ensure control.

3. Some animals can be infected but show little or no sign of infection and the parasites will spread from them to other animals if they are not treated too.

4. If an animal has only a few ticks these can be carefully pulled off making sure the mouthparts of the tick are removed.

5. Rubbing ticks with a cloth soaked in kerosene (paraffin) will make them drop off the host.

6. Large numbers of ticks are treated using sprays and dips It will be necessary to treat all of the herd or flock.

Dipping:

LOOK FOR THE HAZARD

- All dip products contain hazardous substances.
- The harm products can cause depends on what active ingredient they contain and how the products are applied.

Hazardous substances can get into the body in three ways:

- through the skin;
- by swallowing
- by breathing in vapour or aerosol.

DO YOU NEED TO TREAT?

Only use treatments when they are strictly needed for animal health reasons. Never dip sheep for cosmetic purposes.

- **Is your flock at risk from external parasites?**

- What is the parasite (eg scab mite, blow-fly, ticks, keds or lice)?
- Is there a problem in your flock or your area?
- Is your flock closed or open?
- Are weather conditions likely to help the spread of the parasite?

DECIDE WHAT TREATMENT IS BEST

- OP dips are potentially more hazardous to people than non-OP alternatives. However, synthetic pyrethroid dips pose a greater hazard to aquatic life. It is easier to minimize exposure, and protect

the environment, when alternatives to plunge dipping such as pour-ons or injectables are used. Whatever product you use, follow the label instructions carefully to ensure it is effective.

Check:

- which of the authorised products are effective.
- if the treatment is appropriate for the size of your flock, and the way you manage it;
- you have chosen the safest effective product;
- you have planned safe disposal **before** you start.

Active Ingredient		Controls		
Plunge dips				
	Scab	**Blow-fly**		**Tick/ked/lice**
Diazinon (OP)	✔	✔		✔
Propetamphos (OP)	✔	✔		✔
Flumethrin (non-OP)	✔	✘		✔
Amitraz (non-OP)	✘	✘		✔
High-Cis Cypermethrin (non-OP)	✔	✔		✔
Pour-ons (all non-OP)				
	Scab	**Blow-fly**		**Tick (etc)**
		(prevention)	(treatment)	
Cyromazine	✘	✔	✘	✘
Deltamethrin	✘	✘	✔	✔
Cypermethrin	✘	✘	✔	✔
High-Cis Cypermethrin	✘	✔	✔	✔
Injectable (non-OP)				
Ivermectin	✔	✘	✘	✘
Doramectin	✔	✘	✘	✘
✔ - Controls ✘ - No marketing authorisation for control				

WHAT CONTROLS DO YOU NEED?

- **take care not to harm people or the environment.**
- Plan ahead and decide what precautions are needed to protect both. Read product labels and data sheets.
- **If you decide to dip, the following will reduce risks:**

1. Properly designed and sited dip facilities

Good facilities have:

 adequate ventilation. Dipping inside buildings increases the risk of breathing in aerosols (as well as stressing sheep and operators) **so it is better to dip outside**. However, a roof can help stop rainwater making the dip bath overflow;

 an entry slope to reduce splashing from sheep dropping into the dip bath;

 a dip bath of the minimum size for your flock. This reduces the cost of installation, the amount of concentrate needed and the amount of used dipwash to get rid of;

 a dip bath with no leaks or drain holes,

 draining pens away from the dip operator with a sloped, impermeable floor to ensure drainings run back into the dip and which are big enough to allow the sheep to drain properly;

 a piped supply of clean water for top up, decontamination and rinsing.

2 Engineering controls

Use simple physical controls to help keep dip off operators and avoid pollution, for example:

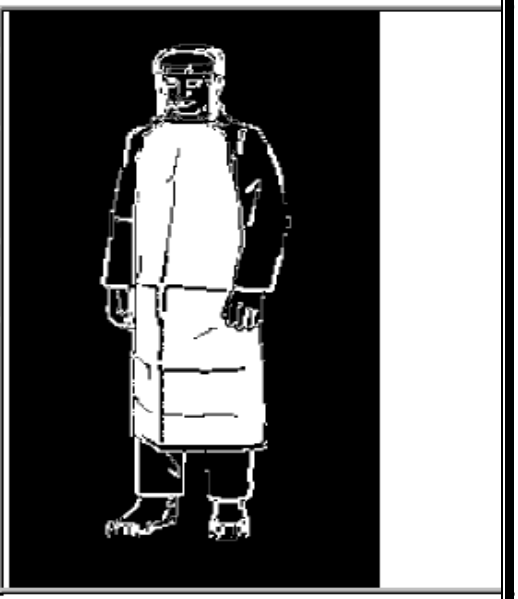
 a screen across the dip entry slope to deflect splashes;

 splash boards or screens up to waist height where operators are likely to be splashed;

 high-sided screens at the exit from the dip so that droplets from shaking sheep do not land on the operators;

3 Personal protective equipment (PPE) - use and care

Face shield
Bib apron (over boiler suit) or **waterproof coat** (PVC or nitrile)
Gloves (Non-lined, PVC or nitrile, heavy duty gauntlet style - 0.5 mm thick and at least 300 mm long)
Waterproof leggings/trousers (PVC or nitrile)
Wellington boots



 if you get a lot of dipwash on your skin, PPE or personal clothing, wash your skin immediately and put on clean clothes and PPE;

 remove and replace damaged PPE such as cracked gloves, waterproof clothing with tears or which cannot be fastened properly, and leaking wellingtons;

 avoid working with sheep still wet from dipping. If you have to, wear the PPE you use for dipping;

 in the weeks that follow dipping, dip residues remain on the sheep. If you have to handle them, wear coveralls and wellington boots.

4 Respiratory protective equipment (RPE)

- RPE is not needed if sheep are dipped in accordance with practices recommended in this leaflet. You should, however, consider using

RPE if you cannot avoid the following tasks and there is poor ventilation:

- pouring concentrate, or cleaning up spillage, in a confined space;
- dipping inside a building or other enclosed area;
- working with freshly dipped sheep in still air conditions.
  - The RPE should be a full or half-mask respirator with a filter capable of removing particulates and gas/vapour.

5 Good working practices:

- Only buy enough dip for immediate use and store it in a safe place with a means of containing leakage.
- Maintain the dipbath to avoid leaks. Check it each time for cracks.
- Read the product label, follow the manufacturer's instructions and **do not use after the expiry date.**
- Do not dip sheep that are ill, heavily pregnant, stressed, full of food or very wet.
- Make sure the dipwash is well mixed and maintained at the proper strength throughout the dipping operation.
- Whenever you stop for a break, wash thoroughly - especially before eating, drinking, smoking or using the toilet.
- Wash your hands and any exposed skin after handling recently dipped sheep.

Never:

- leave dip concentrate in an unmarked container;
- use your hands, arms or feet to immerse sheep;
- allow untrained people to help with the dipping;
- allow anyone not wearing PPE to come near the dipping;
- use dip through a knapsack or hand sprayer.

6 After dipping

- Always allow sheep to drain thoroughly in the draining pen (5-10 minutes).
- Never allow freshly dipped sheep to contaminate watercourses.

DISPOSAL

- Sheep dips are harmful to wildlife and the environment. Careless handling or disposal can pollute watercourses and groundwater reserves.
- Empty the dipbath as soon as practicable, preferably using a pump. Wear PPE to avoid skin contamination.
- Provided the proper measures are observed to prevent contamination of surface and groundwater, used dipwash may be spread on appropriate land.
- **Never empty dipwash into watercourses.** The following steps will help to avoid water pollution:

 Do not apply more than 5000 litres of dipwash per hectare

 Choose an area of land as flat as possible; **do not spread onto sloping land where the soil is saturated with water. Leave an untreated strip at least 10 m wide next to all watercourses. Do not apply within 50 m of springs, wells or boreholes.**

 Do not use fields which are subject to flooding, waterlogged or frozen hard, or which have effective pipe or mole drains or fields where the soil is cracked, severely compacted or where the sub- soil is fissured.

 Do not spread on land which is important for wildlife or which has access for people or animals.

 Consider treating the used dipwash before disposal to reduce the environmental risk. **Different treatment methods are needed for different dip products and using the wrong one can increase risks.**

 Avoid forming pools of dip when spreading on land. Stock should not be grazed on the land for at least one month.

 Alternatively, or if suitable land is unavailable, store the used dipwash in a suitable holding tank, designed to retain any spillage, and dispose of it using a licensed waste disposal contractor.

- **Never use soakaways as they are no longer an acceptable means of disposal for used dipwash as they represent an unacceptable risk to ground and surface waters. Do not build new soakaways for used dipwash disposal.**

The following should be disposed of by a licensed waste disposal contractor:

- ***Empty containers****:* Rinse at least three times and use the washings to top up the dip bath. Crush or puncture to prevent re-use but try to keep the label legible.
- ***Contaminated clothing to be discarded****:* Package securely in sealed containers or plastic bags.
- ***Spillages****:* Use absorbent material such as sand, earth or sawdust to collect spillages of concentrate or diluted dip. Place in a sealed container and label.

Disposal of dead animals

If an animals dies, other than as a result of being slaughtered for meat, you must dispose of the body (carcass).

The carcass must be properly disposed of to prevent disease from spreading.

Carcasses can be buried in a deep hole or burnt.

Learning objectives

After studying this unit you should know:

1 The handling of dead animals.
2 Anthrax and sudden death.
3 Post mortem (opening the body of the dead animal to check it).
4 How to bury animals.
5 Burning dead animals.

Handling dead animals

If you do not know why an animal has died you should always think of the diseases which humans can catch from animals like rabies, anthrax and others. Always take care and carefully wash and disinfect your hands and clothes afterwards.

If you can you should inform your veterinarian about the dead animal as he may want to do a post mortem (after death) examination. When a veterinarian carries out a post mortem examination he will cut open the body to find out what caused it to die. This will help him to treat other animals and stop disease spreading.

Stiffening of the body after death

One to seven hours after it has died an animal's body will become stiff and hard because of chemical changes in it. This happens quickly in hot weather taking longer in cold temperatures.

Anthrax

Anthrax is a very dangerous infectious disease of livestock. You should suspect anthrax if:

An animal suddenly dies having shown no signs of being sick.
The animal has had a very high temperature (fever) and bloody diarrhoea, dying 1 to 3 days after becoming sick.
Dark blood comes out of the nose and anus after death and shows no sign of clotting.

Anthrax can kill people so you must be very careful when you handle the dead animal. You should burn or bury the dead animal immediately. All infected material such as bedding, soil and feed must also be burnt.

The anthrax germs can stay infective in the soil for many years.

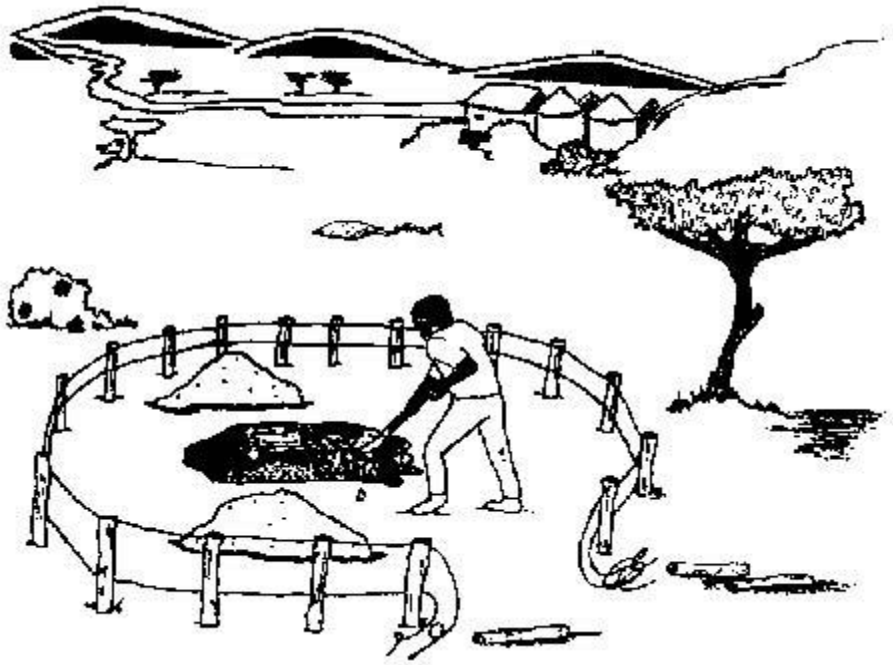
You must ask your veterinarian for help and advice immediately in the case of anthrax.

Burying

Burying dead animals is better than burning them. Always chose a site away from

any river, well or spring. Dig a pit (deep hole) 2 metres deep and wide enough to take the number and size of the dead animals. Put the carcasses into the pit so that they are on their backs with the feet upwards. In the case of animals dying from anthrax you must fence off the area after burying the animals. The anthrax germs can survive in the soil for many years and you must make sure that other animals and people do not go onto the site.

Burying

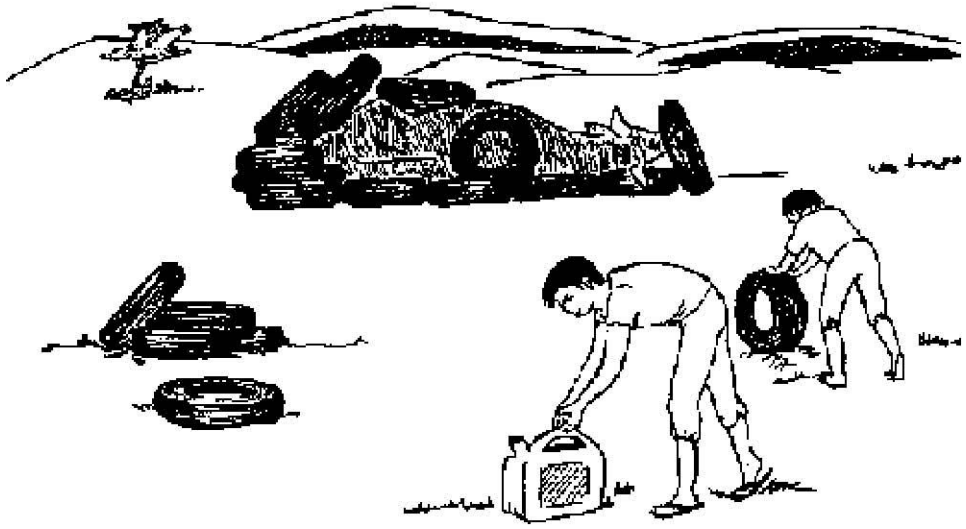


Burning carcasses

In order to properly burn dead animals you must put fire under and over the carcass. The fire must be very hot and big enough to burn all of the body.

To do this first dig a channel in which to put the body. A channel 1 metre long, 30 centimetres wide and 40 centimetres deep will be needed for a cow or horse. Put straw and wood inside the channel and place the carcass on top. Cover the animal with straw and wood before spraying the pile with some kerosene or petrol and lighting it.

Burning carcasses



You can use old tyres to burn carcasses. Place the dead animal on a layer of tyres and cover the body with more tyres. Use kerosene or petrol to start the fire.

Remember that proper disposal of carcasses is essential to prevent disease spreading to other animals and people.

You now know about infectious diseases such as rinderpest, foot and mouth, tuberculosis and anthrax but you should also ask your veterinarian about other infectious diseases in your area.

To be a successful PAHCW you must always ask questions and observe things. This is the way to learn.

Ventilation:

Is an air exchange process – contaminated air inside the barn is exchanged for fresh outside air.

- Good ventilation may lead to greater productivity; e.g., maintaining air movement in the area of the feed manger makes the cattle more comfortable, especially important during hot weather as an aid to maintaining dry matter intake.

Ventilation Design and Operation for Cattle Barns:

1- Uninsolated barns with natural ventilation:

- In a cold barn, indoor temperatures are allowed to fluctuate with outdoor temperatures. In winter, ventilation must be sufficient to maintain indoor temperatures within 3-5°C of outdoor temperatures.

- During summer, ventilation should be sufficient to maintain indoor temperature at or slightly below outdoor temperature.

- Moisture naturally present causes the barn itself to act as an evaporative
- Cooler.

- **A cold barn with natural ventilation has these general characteristics**:

a) No insulation,

b) Open ridge and eaves,

c) Sidewalls and end walls that open.

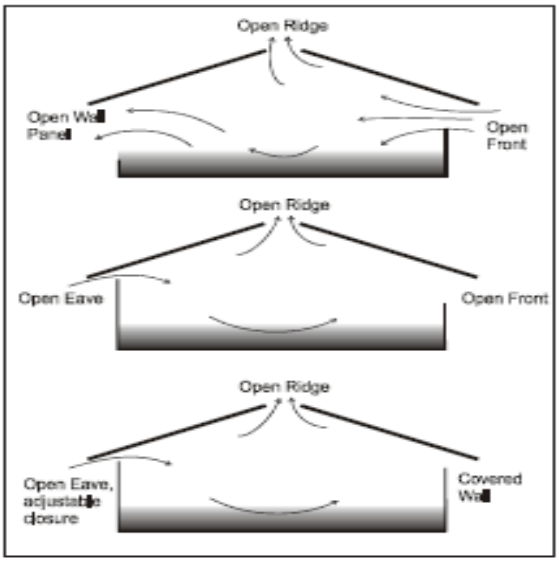
- Providing an open ridge and open Eaves has long been recognized as a mean of creating a stack effect to cause air exchange, especially for controlling moisture in winter.
- Provide a ridge opening of 5 cm per 3 m of barn width and equivalent open area divided between the two eaves.

- **Summer ventilation mainly depends on the wind.**

Factors affecting ventilation rates due to wind include:

- area of building openings.

- local obstructions (hills, vegetation, nearby buildings)
- wind speed and direction. To obtain maximum air exchange rates due to wind forces, maximize inlet and outlet openings and site buildings for maximum exposure to existing winds.



: **Airflow in naturally ventilated buildings. Air flow patterns vary with wind direction and velocity.**

2 - Insolated barns with mechanical ventilation

- These buildings are well insulated. Fans with thermostat controls automatically regulate the ventilation rate as outside conditions change, diurnally and seasonally.
- Three levels of ventilation, using fans, must be provided if cattle occupy the barn year-round. Summer ventilation rates of 60 to 90 air changes per hour are not uncommon, requiring several fans. These levels are on the order of ten times the minimum continuous rate for winter.

3 - Warm barns with natural ventilation

Natural ventilation for warm barns lowers investment and operating costs. Insulation and a warm environment in winter are the same as with mechanical ventilation.

Adjustable openings provide for modulating both the stack effect and the wind effect as necessary, depending upon outside conditions. Because frequent adjustments in ventilation openings, sometimes several times per day, are required to compensate for changes in outside conditions - wind velocity or direction, temperature, solar radiation, ventilation openings are usually opened and closed automatically by various types of actuators controlled by thermostats.

Consequences of Mismanaged Ventilation in winter:

1- Reduced dilution of ambient air

2 - Building components affected by poor ventilation

3- Misguided use of insulation in cold barns

Housing for cattle

The type of housing provided will depend on a range of factors including

1. **Geographic location.**
2. **Availability of straw.**
3. **Size of the unit .**

House Types

1- Bedded house

- Such houses consist of bedded pen(s) with the total living area covered in bedding material, which normally is straw.

- Cattle should be housed in groups of not more than 20 to aid management.

- This type of house requires 4 to 6 kg of straw per animal per day which equates to approximately 1 (metric) ton straw per animal for a winter housing period.

- The completely bedded system does not prepare the hooves of the animals for subsequently walking on harder surfaces such as concrete.

- Sometimes the hooves may become overgrown and misshapen, which may lead to lameness problems.

- The systems are relatively cheap to construct the high straw requirement with associated labour costs must also be taken into account when making comparisons with other systems.

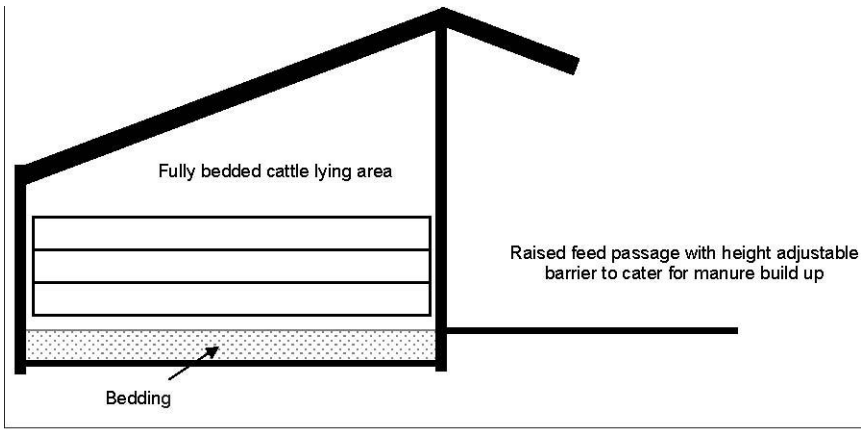


Figure 9-1: **Straw bedded facility cross-section showing raised passageway**

2- Bedded house with concrete or slatted feeding stand

1) In this type of facility the animals come to feed on an area of solid concrete or an area covered with slats. **2)** In the case of solid concrete the area is cleaned by an electric, hydraulic or tractor powered scraper. **3)** The design has the advantages that lower quantities of straw are required. **4)** Straw usage is in the order of 2 to 3 kg per animal per day

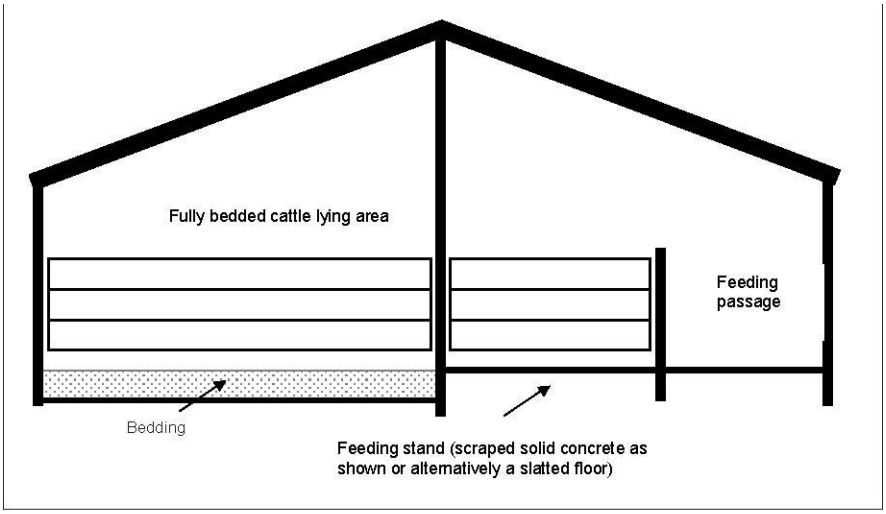


Figure 9-2: **Bedded house with concrete feeding stand**

Bedded house with concrete feeding stand shown or alternatively a slatted floor) Beg nddiFully bedded cattle lying area Feeding stand (scraped solid concrete as Feeding passage Bedding

3- Bedded house with sloped concrete floor:

- This housing system involves the frequent removal of manure but daily straw requirements can be as low as 1 to 3 kg feeding passage is typically used with confinement pens on each side.

- The superstructure is typically constructed from steel stanchions, steel trusses and timber purlins.

- The floor is laid with a slope of 5 to 10 %.

- The system operates on the principal that the movement of the animals will transfer the manure down the slope where it is removed by scraping.

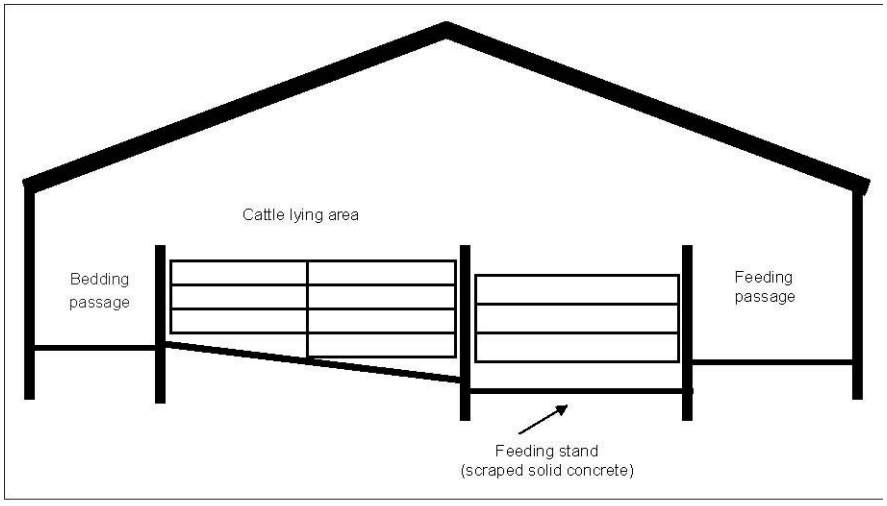


Figure 9-3: **Bedded house with sloped concrete floor**

Bedded house with sloped concrete floor Feeding stand (scraped solid concrete) Cattle lying area Bedding passage Feeding passage Bedding passage

4- Cubicle house:

- A cubicle house provides an animal with an individual safe lying area.

- The system is widely used in the dairy industry for cows and the house type provides a clean lying area without the requirement for bedding material.

5- Slatted floor house

- The majority of such systems use concrete slatted floors with the liquid manure or slurry falling through the floor perforations into a below ground concrete tank.
- The depth of the tank is such so as to provide adequate waste storage capacity for the housing period and is now typically about 2, 5 m.
- the advantage in that it provides a more uniform removal of stale air from over the animals throughout the buildings.

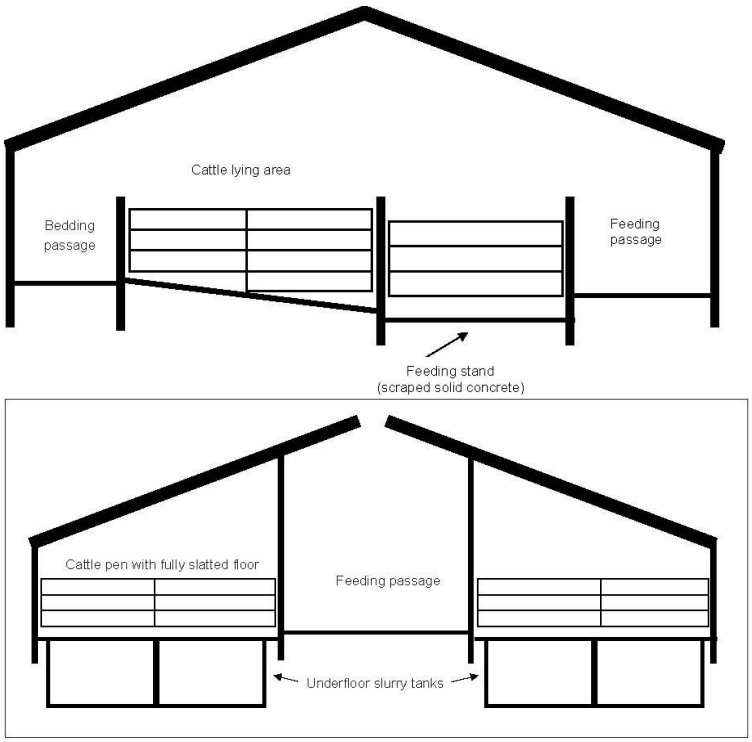


Figure 9-4: **Cross section of slatted floor house**

Cross section of slatted floor house Cattle pen with fully slatted floor Feedagessag PniUnderfloor slurry tanks Cattle pen with fully slatted floor Feeding passage Underfloor slurry tanks

6- Sloped floor system without bedding

- This design is based on solid floors, which slope towards narrow manure collection channels covered with slats.

- The optimum length of the sloping floor section to avoid manual cleaning is approximately 1.5 m. The slope should be 1:12 (8 %).

Housing for chickens and ducks

If birds are allowed to wander around freely, disease can spread quickly through all the birds kept in the community.

Keeping birds in a closed area and providing them with shelter is the first step towards improving them.

A covered shelter (house) will give chickens and ducks protection from wind, rain, snow and predators such as foxes.

Learning objectives

After studying this unit you should know:

1 Why chickens and ducks should be housed.
2 How many birds can be kept together in a house.
3 How to build a house for chickens.
4 Nesting boxes (for laying eggs).
5 Runs (fenced areas) for birds.
6 The differences between houses for chickens and ducks.

Why we house chickens and ducks

If chickens and ducks are kept in houses:

They will be protected from the sun, rain, cold and snow.
They will be protected from other animals such as foxes and birds of prey, from theft and from being killed on the streets.
Young birds are protected.
Food and water can be controlled.
Birds can be prevented from eating bad food or drinking dirty water.
Nest boxes can be provided to make it easy to collect eggs.
The spread of disease can be stopped.

How many birds should be kept in a house

There must be enough space to hold all the birds plus the feed and water containers (troughs). If too many birds are kept together they will start to peck (bite) each other. If any bleed, the problem will become worse, as more birds start to peck. Young birds will need less space than older birds and perches must be provided for chickens to roost on at night.

The ground or floor area required is:

50 chickens can be kept in 16 square metres (4m × 4m).
1 metre of perch must be provided for every 5 adult chickens.

Housing for chickens

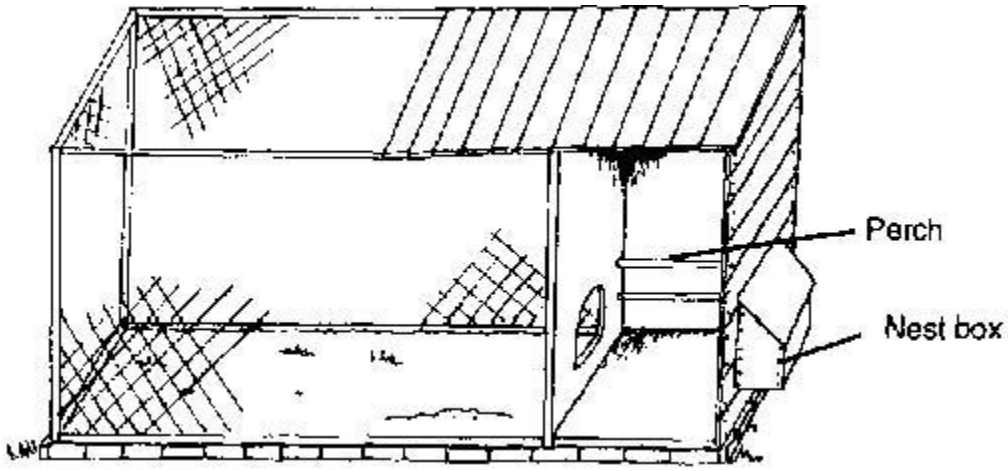
Suitable housing for chickens should be:

Built on high ground close to the home of the owner so that he can keep an eye on it.
The house should be 2 metres high and it is better if the first 50 cm of the walls are brick, stone or concrete while the rest is wood, wood and mesh wire, corrugated iron sheeting or any other suitable materials. Small houses can be made from wood and mesh wire.

Runs for birds (fenced areas)

Every house will need a run for the birds to be able to exercise in, pick up grass, insects etc. The run must be fenced around with wire or other suitable material and if possible should be shaded by some trees. Part can be covered to allow birds to use it on rainy days. If possible the run should be divided into two areas to keep birds out of one area to allow fresh grass to grow 50 chickens require a 16 square metre house and 500 square metres of run.

Runs for birds



Nesting boxes (for laying eggs)

Nesting boxes are boxes in which the hen can lay her eggs. You can make them from wood, baskets or pottery. Line them with straw or hay as a nest. Wooden boxes can be built on to the side of the house and opened from the outside to remove the eggs.

Medicines

Terms and words used in medicine

Medicines (drugs) when given properly will cure animals. When you use medicines you will need to know the following words:

- Intramuscular (i.m.) injection, intravenous (i.v.) injection and

subcutaneous injection.

- Drenching, boluses, dipping and spraying .
- **Powder**: a dry medicine which is mixed with water to give to the animal or a dry medicine which is used on the outside of the animal.
- **Ointment**: creamy or oily medicine to spread on the skin or on different parts of the body.
- **Drops**: liquid used in small amounts, such as eye or ear drops.
- **Dress**: to clean a wound and put on disinfectant.
- **Sulpha and antibiotics**: medicines which are used to kill germs.
- **International units (I.U.)** : are units used to measure antibiotics.

Size and weight of animals

It is very important to know how much medicine you need to give to each animal. This book deals with 14 different types of animals which can be divided into groups according to their size.

Camel, horse, large cattle and buffalo.	Large animals:
Small cattle, donkeys, mules, llamas and large pigs.	Medium animals:
Sheep, goats, alpacas, small pigs, young cattle, young buffalo and young camels.	Small animals:
Young sheep, goats and piglets.	Very small animals:
Chickens, ducks and turkeys.	Birds:

Disinfectant for wounds

These are usually liquids and are used to clean dirt from the wound and kill germs.

- **Salt water**: Add a large spoonful of salt to a litre of clean water to make a very cheap and good disinfectant for wounds.
- **Acriflavine:** An orange or red powder. Prepare by adding one part of powder to 1 000 parts of clean water.-This is very good for cleaning wounds and abscesses after removing the pus.
- **Tincture of iodine**: A dark brown liquid used to dress wounds.
- **Gentian violet**: A liquid for dressing wounds and burns.
- **Alcohol**: Clear like water, this is good for cleaning wounds and also the hands before carrying out operations e.g. castrating animals.
- **Dettol and TCP (solution of phenol and sodium salicylate):** Trade names for disinfectants which can be used on the animal, for your hands and instruments.

Disinfectants for animal houses and equipment

- **Hot water and soap. Carbolic soap is the best if you can find it.**
- **Jeyes, Chlorox and creosote can be used by adding 5 parts to 100 parts of water**.

Dressings for mouth lesions (mouth wash)

Use a big syringe to flush out the mouth

- Salt and water or potassium permanganate or hydrogen peroxide.
- Copper sulphate (blue stone). Use 2 parts in 100 parts of water.

Dressings for the foot

These solutions are used to kill germs causing foot rot or infecting wounds of the foot.

- ❖ Tincture of iodine or Dettol or TCP (solution of phenol and sodium salicylate).
- ❖ Copper sulphate (blue stone) use it as a 10% solution by adding 10 parts to 90 parts of water.
- ❖ Formaldehyde: This is available as a 40% solution in bottles. Add one part of this to 8 parts of water to make a solution of the correct strength.
- ❖ Chloramphenicol: A spray. This is good for use on the foot and on other wounds.

Antibiotic powders for wounds

These must only be used to kill germs in wounds.

- ❖ Chloramphenicol, tetracycline or any antibiotic as a powder can be dusted over the wound.

Antibiotics for injections

These are injected into the animal either subcutaneously, intramuscular or intravenously.

- ❖ Procaine penicillin G: Give 100,000 I.U. for every 10 kg of body weight by intramuscular injection for 3 to 4 days.
- ❖ Benzathine penicillin G: Give 120,000 I.U. for every 10 kg of body weight by a single intramuscular injection.
- ❖ Oxytetracycline: Give 50 mg for every 10 kg of body weight by intramuscular injection for 3 to 4 days.

Antibiotics by mouth (oral)

These may be as powders, boluses, capsule, tablets or pastes.

• Oxytetracycline tablets: Give one 250 mg tablet for every 20 kg of

body weight every day for 4 to 5 days.

Sulpha drugs for wounds

These powders are very good for keeping the wound clean and dry.

- Sulphanilamide or sulphathiazol: These are very good dusting powders for wounds.
- Negasunt powder: This is a mixture of mainly sulphanilamide and can be used daily on a wound.

Sulpha drugs by mouth (oral)

- Sulphaguanidine: This may be given orally as a bolus or can be broken and mixed with the animal's feed. Give 50 mg for every 10 kg of body weight every day for 3 to 4 days.

Sulpha drugs by injection

- Sulphadimidine solution: Give 1 gm for every 10 kg of body weight by intravenous or subcutaneous injection every day for 3 to 4 days.

Animal housing:

Sheep housing:

Barns for sheep are related to tow basic building shells:

1- Open front building for minimal shelter>

2- Completely enclosed building for maximum shelter.

Ventilation is essential in both open fronts and enclosed building to:

1- Control moisture.
2- Modify temperature.
3- Furnish fresh air.
4- Remove gases and odors>

- **The type of the floor:**

1- Packed earth.
2- Gravel
3- Crushed rock.
4- Concrete.

- **Use doors at least 2.5 m wide *2.5 m high for tractor access.**

- **Windows or plastic light panales in the walls 3% - %% of the floor area can** supply natural light.

- **Install artificial general lighting for night, 100 watt lamp for each 120 – 150 sq m. of floor area.**

- **Provide electric outlets and line capacity for lamping pen, heat lamp, heating and ventilating equipment.**

Barn Style:

Barn style are determind by the roof shape, the common shape are :

1- Shed:

1- The shed roof is widely used on both open front and enclosed permanent free standing building.

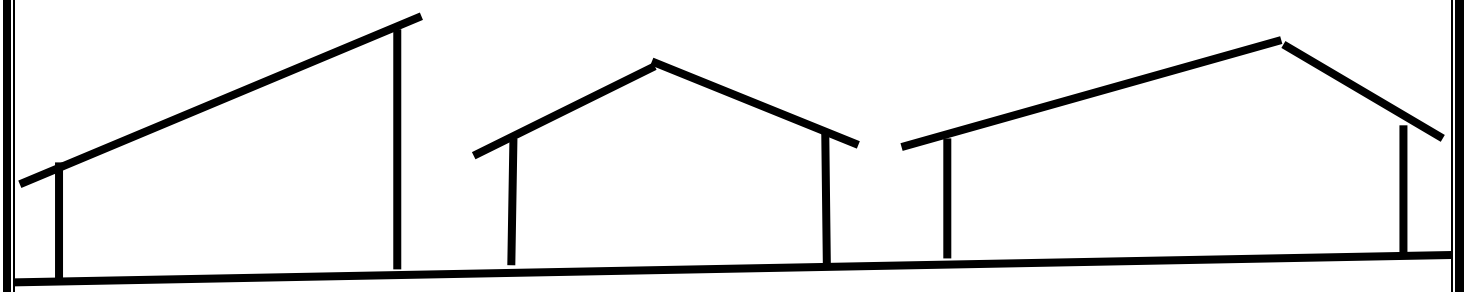
2- A shed roof building is relatively low in cost.
3- Provides good headroom.
4- Simple to building.
5- Free standing building is easy to ventilate.

2- Gable:

1- The gable roof is the most widely used for both open front and enclosed building.
2- It is medium in cast.
3- Simple to construct and insulate.
4- It is adaptable to natural building ventilation through eave , sidewall, and ridge opening and clear-span construction with trussed rafters.

3- Offset gable:

Offset gable roof has towx slopes of different length, so one building side wall is higher than the others.



Shed **gable** **offset gable**

Stabling:

Equines, especially horses, can be kept in stables when not working. They can be kept in a field with some form of shelter against bad weather conditions.

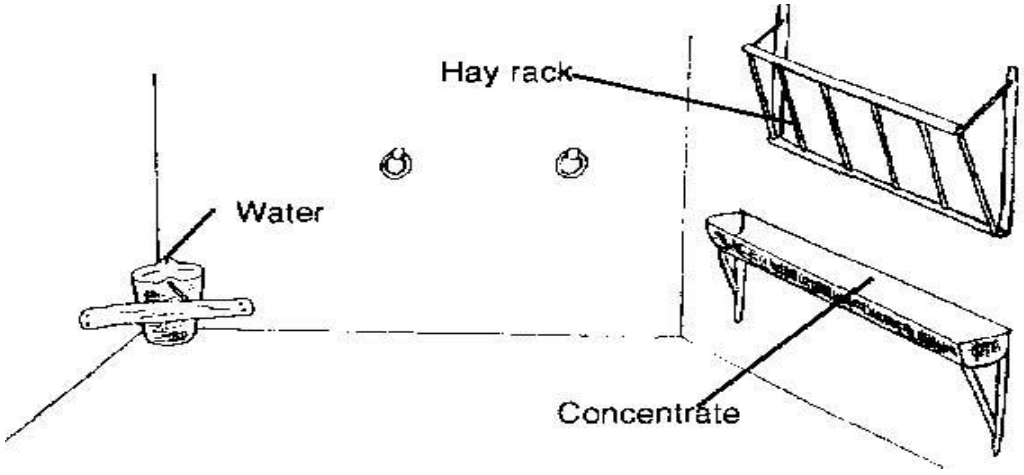
Stables

Horses are often kept in stables when not working.

- **A good stable can be made from**: wood, brick or concrete and should have a solid floor which slopes gently towards the door to allow urine to flow out.
- The stable should be big enough to allow the animal to move about, lie down and roll over.
- The stable should be 3.5m × 3m in area or larger. Small animals will need less space.
- A stable where the animal is free to move is called a **loose box**. The door of the loose box should be divided into two so that the top half can be left open during the day to allow fresh air into the stable and allow the animal to see what is

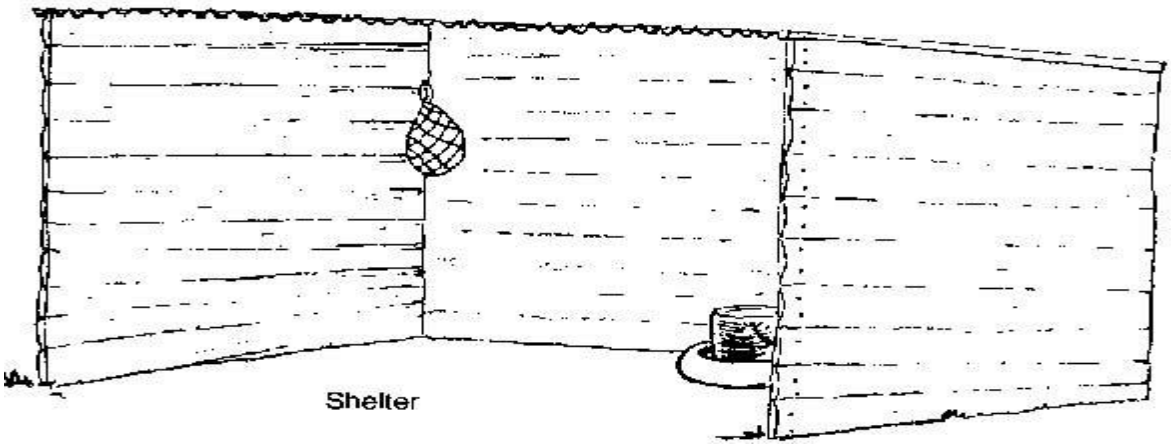
going on around it.

Stables



- Concentrate feeds for the stabled horse are placed in a manger (a feeding trough) which is fixed to a wall at least 60 cm above the ground.
- Hay is fed from a hay rack of wooden or metal bars attached to the wall at least 1 metre from the ground.
- Hay can also be fed from a rope net hung from a hook or ring in the wall.
- A metal ring should be attached to a wall to allow the animal to be tied up when it is groomed or examined.
- Water can be provided in a strong bucket placed in a corner of the stable with a bar of wood to hold it in place.

Shelter



- Animals should be provided with shade and shelter.
- Trees provide shade and shelter can be provided by a three-sided shelter made of wood or sheeting.
- Animals can be fed hay or concentrates in the shelter when necessary.

Keeping the stable clean

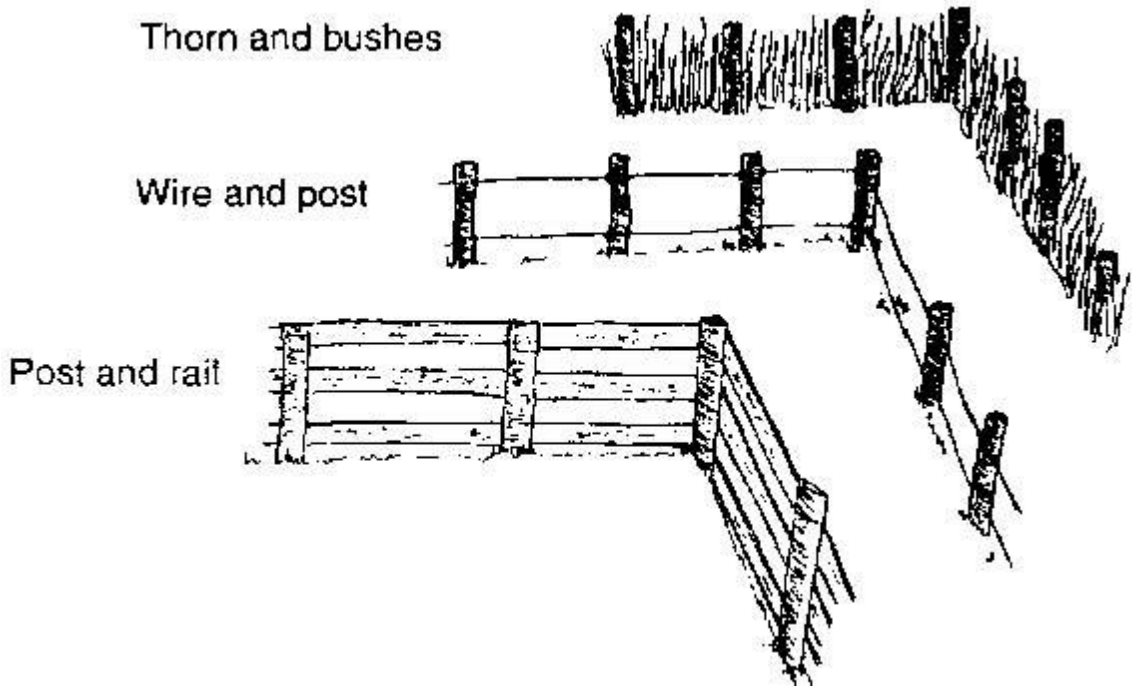
- The manger and buckets should be emptied and cleaned every day and fresh water provided.
- A good bed of **straw, sawdust, wood shavings or clean sand** should be provided which is deep enough so that the floor of the box is not uncovered by the animal's movements.
- Remove any soiled bedding and dung every day and take to a dung heap.
- Add some fresh bedding to the box.

- Removing the dung helps to reduce fly problems and the risk of infection from parasites.
- Bedding should be completely renewed when possible.
- The dung heap rots and produces heat which kills eggs of parasitic worms. When it is well rotted the dung can be used to fertilise land.

Keeping equines out at pasture

- Fields for equines should be well fenced.
- Fencing needs to be strong and can be post and rail or wire.
- If a wire fence is used the bottom wire needs to be at least 30 cm off the ground to prevent animals getting their feet caught in it.
- A good strong hedge which the animals cannot push through not only acts as a barrier but will provide shelter against wind.
- Hedges should be made of thorn or other strong bushes planted in two parallel rows.

Keeping equines out at pasture



- Water will need to be provided in a trough or strong bucket which will need to be filled daily.
- One third can be used while the remainder is rested or used for hay.
- Removing dung from the pasture will reduce contamination by worm eggs.

Disposal of dung

the droppings or dung of domestic animals must be disposed (got rid of). Infections, e.g. parasites, can spread through dung. It will also be used by various flies as a place to lay their eggs.

Animal dung can be used to fertilise soil for crops, can be dried and used for fires or may be mixed with clay to make building materials.

Uses of the dung:

1. Cattle dung is mixed with clay or mud to make bricks or the walls of houses.
2. It is dried for fuel for fires.
3. It is used as a fertilizer on soil used for growing crops.

Importance of dispose of dung:

1. Germs which cause disease and the eggs of parasites which infect the animals are present in the dung.

2. Removing dung from where the animals are kept helps to reduce the spread of disease.

3. Dung will also be used by flies which will lay their eggs in it and the maggots will feed on the dung.

Disposing of dung:

- Collect the dung into heaps to slowly rot. As it rots the dung produces heat which will kill germs and the eggs of parasites. When it is well rotted the dung can be used to fertilize agricultural land.

- Do not make dung heaps close to houses or too close to stables or other animal housing. Flies attracted to it will become a nuisance.

- Do not place dung heaps on land which is near to water or may be flooded when the rainy season comes. Dung can contaminate the water and spread disease to

animals which drink it.

Types of Horse Bedding

- There are several types of bedding used for horses. Straw is the most popular, followed by wood shavings, then paper and finally rubber mats.
- The bedding chosen should provide a clean, dry environment for your horse.
- The most important factor to consider when choosing bedding is the health of your horse.
- Another factor to consider is the cost. This varies depending on the type you choose and the time of year.

1. Cardboard
2. Hemp
3. Peat Moss
4. Rubber Matting
5. Shredded Paper
6. Straw
7. Wood Shavings

1. **Straw**

Straw is the most common bedding and comes in a variety of forms. It is quite absorbent, cheap, warm and easy to maintain.

- **Wheat Straw**

Good wheat straw makes excellent bedding. It is still the most popular bedding. It can be used for a deep litter, and it will take you 4-6 bales to start a bed. You will need around 5 bales a week for a horse that is stabled at night.

Advantages:

Wheat Straw is cheap, easily available, absorbent, warm and easy to muck out. It rots down well, and is easy to dispose of in a muck heap or can be sold or given away as it makes a good garden fertiliser.

Disadvantages:

Wheat Straw is not suitable for horses with dust allergies or respiratory problems.

It can be very dusty and poorer quality straw can be mouldy too. Storage can be a problem - bales need a lot of space in a dry area.

❖ Barley Straw

This is usually longer, of better quality and a brighter colour than wheat straw. Barley straw can cause problems if the horse is prone to eat it to excess.

❖ Oat Straw

Oat straw is palatable and more expensive. It quickly becomes saturated, which makes it the least suitable straw for bedding.

Advantages: Firstly it gives a clean and bright appearance. Straw manure can be disposed of more easily than other types of materials. In a good harvest year it can be cheap.

Disadvantages: Some horses will eat the straw and it can cause several problems such as allergic coughing to the dust.

In a bad harvest it can be quite expensive.

2. **Wood Shavings**

- Wood Shavings are a popular form of bedding as they are very absorbent and easy to muck out.
- If you use alternative wood shavings, such as waste from a saw mill, you may find the shavings are sharp and contain rubbish.
- Wood Shavings can be used for a deep litter and will take 4-5 bales to start a bed. You will need 1 or 2 bales a week for a horse that is stabled at night. They can be expensive.

Advantages:

Wood Shavings are easy to muck out, easily stored and easily disposed of (they will burn). They are absorbent and for allergic horses, dust-free (or dust-extracted) shavings are available.

Disadvantages:

If you are unable or concerned about burning the shavings to dispose of the waste, wood shavings can be hard to get rid of. They take a long time to rot down and are generally unwelcome on muck heaps.

3. **Shredded Paper**

- Shredded Paper is becoming more popular as a choice of bedding as it is one of the cheapest options and has many advantages. It is not

suitable for a deep litter bed. It will take 5 bales to start a bed and 1 or 2 bales a week for a horse that is stabled at night.

Advantages:

Shredded Paper is completely dust free and is an excellent choice for allergy-suffering horses. It's easy to store, light to work with, quite absorbent, very warm in the winter and can be cheap.

Disadvantages:

The most effective method of disposal would be to burn it. It can be difficult to keep a tidy muck heap as shredded paper tends to blow around in the wind. The dye from the paper can sometimes mark a horse's coat and it can ball up leaving a bare floor for the horse to lie on.

4. **Peat Moss**

The use of Peat Moss as a bedding has declined as it is expensive and can be difficult to obtain. It is suitable for a deep litter bed.

Advantages: Peat Moss bedding is soft, easy to dispose of and rots down quickly.

Disadvantages: Peat Moss can be expensive, hard to find and unattractive as a bedding. It is very heavy to handle and difficult to muck out, mainly because the clean parts of the bed look identical to the dirty parts that need removing.

5. **Hemp**

Hemp is a relatively new type of bedding. It is a natural fibre derived from the hemp plant. It can be used in a deep litter bed, and can be shown to be economical in the long run.

Advantages: Hemp has good absorbency qualities, and makes a very soft bed. It is dust free and breaks down very quickly. It is ideal for a deep litter bed.

Disadvantages: Hemp is initially expensive, it is not edible and may cause swelling to a horse's stomach if ingested.

6. **Rubber Matting**

Rubber Matting has many advantages and while initial costs can be high, running costs can be practically non-existent. Once fitted, running costs can be very low.

Advantages: Completely dust free and can be used with a bedding of your choice. Drains well and is warm. Very safe for your horse - soft rubber reduces risk of injury. Easy to muck out.

Disadvantages: If your horse is messy, then the no bedding option may make the horse/rugs dirty. Some extra bedding may also be required to stop draughts. Initial cost is high. The stables need to have good drainage if no bedding is used to absorb the urine.

7. **Cardboard**

Cardboard is becoming more popular as a choice of bedding.It has the same insulation qualities and storage qualities of straw or wood shavings. For grooming qualities, cardboard is excellent

because it keeps horses cleaner than other bedding products and is recommended by the ILPH and veterinary practices.

Advantages:
Cardboard is completely dust free and is an excellent choice for allergy-suffering horses. It's easy to store, light to work with, absorbent (5 times more than shavings, 2 times more than Hemp, 6 times more than Straw - Test results by the Equine Research Council of Canada), very warm in the winter and can be cheap. It does not blow about the yard and is easy to muck out.

Disadvantages: The most effective method of disposal would be to burn it although it can be used as an effective deterrent for weeds.

ZOONOTIC DISEASE TRANSMISSION

Transmission of infections requires three elements:

4. A source of pathogens.
5. A susceptible host.
6. A means of transmission for the microorganism .

Sources include animals or environments contaminated by animals. Pathogens may be transmitted to humans directly from the animal via blood or other body fluids during diagnostic or treatment procedures.

Animals may be clinically ill, asymptomatic carriers of an infectious agent, or harbor endogenous flora that are pathogenic to humans.

Pathogens may also be transmitted indirectly from objects in the environment including walls, floors, counters, equipment, supplies, animal feed, and water.

Host resistance to pathogenic microorganisms varies greatly. Some persons may be immune to infection or may be able to resist colonization by an infectious agent; others exposed to the same agent may establish a commensal relationship with the infecting microorganism and become asymptomatic carriers; still others may develop clinical disease. Host factors such as age, underlying diseases, irradiation, pregnancy, and breaks in the body's first-line of defense mechanisms (intact skin, cough reflex, stomach acid) may render a host more susceptible to infection. Conversely, vaccination may reduce susceptibility to infection.

Transmission Mechanisms

Transmission occurs through three main mechanisms: contact, aerosol, and vector-borne. The same agent may be transmitted by more than one route. Transmission is largely influenced by the stability of the pathogen, the pathogenesis of the disease it causes, and the routes by which it leaves the infected host. Different agents vary in their degree of infectivity through the various routes.

1 **Contact transmission** can occur when pathogens from animals or their environments enter the human host through three routes: ingestion, mucous membrane exposure, and cutaneous/percutaneous. Direct contact transmission may occur during activities such as examining, medicating, bathing, and handling animals. Indirect contact transmission involves contact with a contaminated intermediate object, such as occurs during cleaning cages and equipment and handling soiled laundry. Injuries from contaminated sharps, such as scalpel blades, needles, and necropsy

knives, may result in exposure to live vaccines and pathogens. In addition, injury from sharps increases risk of exposure to other pathogens through direct and indirect contact (4).

2 **Aerosol transmission** can occur when pathogens from animals or their environments travel via the air and enter the human host through inhalation and/or mucous membranes. In general, risk to veterinary personnel increases with proximity to the source and the length of time over which exposure occurs. Transmission over short distances occurs when droplets created by coughing, sneezing, vocalizing, or procedures such as suctioning and bronchoscopy are propelled through the air and deposited on the host's conjunctivae, nasal or oral mucosa. Certain pathogens may remain infective over longer distances (4, 30). However, defining the infective distance is difficult because it depends on particle size, the nature of the pathogen, and environmental factors (30). Although data are not available to define specific infection risk from aerosol transmission for most pathogens, some pathogens known to be transmitted over longer distances include *Coxiella burnetii* (31-33) and *Mycobacterium bovis* (34).

3 **Vector-borne transmission** occurs when vectors such as mosquitoes, fleas, ticks, rats, and other animals transmit microorganisms. Animals may bring flea and tick vectors into contact with veterinary personnel. Veterinary personnel working in outdoor settings may be at risk for diseases carried by arthropods and other biological vectors.