**FARM STRUCTURES**

**FARM LAYOUT**

Farm layout is the way the farm is planned and set up. It refers to the way roads, fences, paddocks, vegetable gardens, farm stores, workshops and fields are positioned on the farm.

**Benefits of a proper farm lay out**

1. It facilitates proper conservation of soil, water and plant nutrients.
2. It permits easy control of animal parasites and diseases.
3. There is an easy control of crop pests and diseases in the field
4. It facilitates easy drainage of the agricultural land.
5. It facilitates the practice of rotational grazing and crop rotation on the farm.
6. The farmer is able to estimate the right amount of agricultural chemicals e.g. fertilizers, insecticides, fungicides and herbicides without wastage.
7. Proper positioning of roads facilitates easy accessibility during supervision and transportation.
8. The use and maintenance of farm machinery is properly controlled.
9. It enables the farmer to calculate the crop yield per unit area, thus estimate returns.

**Factors considered when planning a farm layout and siting farm buildings**

1. **Topography:-** Farm buildings should be on top or on gentle slopes.
2. **Accessibility:-** Farm buildings, vegetable plots and animal pens should be well accessed by the farmer. This facilitates easy transportation of farm input and output.
3. **Water source:-** Its required for livestock use, irrigation and domestic work. The source should be permanent such as borehole, weirs, running streams etc.
4. **Power source:-** A source of power in form of electricity should be considered purposely for food processing.
5. **Drainage:-** Farm buildings and roads should be sited on well drained soils to avoid dampness and destruction.
6. **Soil fertility:-** Buildings should be sited on unproductive barren soils. The most fertile should be left for perennial crops and vegetable production.
7. **Wind direction:-** To avoid destruction, farm buildings should not be sighted in direction of scotching winds.
8. **Centrality:-** Buildings are most conveniently sited in centre of the farm to ensure easy supervision.
9. **Direction of sunlight:-** Ensure that hot rays of the sun especially at sunrise and sunset do not enter farm buildings.
10. **The size of the farm:-** The bigger the farm, the more the structures and enterprises established.
11. **Security:-** Poultry units, dairy sheds, crop and tool stores should be close to the main farm house for protection against thieves and wild animals.
12. **Purpose of buildings:-** Buildings with similar functions should be appropriately placed close to each other to minimize labour requirements and increase planning efficiency.
13. **Allowance for future expansion:-** Since the farm is expected to keep growing, there should be some land set aside for future expansion.
14. **Personal wishes:-** This involves the farmers personal thinking and wishes as he plans for his farm.

**FARM STRUCTURES**

These are physical structures set up on the farm for general purpose of improving production efficiency. They include fences, farm buildings

1. **Fences**

It is a physical structure set up to form an enclosure around the farm.

**Importance of fencing on the farm**

1. It helps to demarcate farm land thus prevent disputes.
2. Fences facilitate easy control of ticks and internal parasites among livestock.
3. It helps in the control of grazing on the farm.
4. It gives privacy to farm homes.
5. It provides security by keeping off thieves and tress passers.
6. It facilitates isolation of sick, young, pregnant and weak animals from the mature and healthy.
7. Fencing enables the farmer to practice mixed farming.
8. Fences confine animals for specific operations such as drenching, castration etc.
9. They keep off wild animals that would spread diseases and also attack livestock.
10. They facilitate protection of water sources from contamination.
11. Some fences also add value and beauty to the farm.

**Limitations of fencing**

1. Fencing materials are very expensive.
2. Fencing requires a lot of labour to carry out.
3. They restrict animals from free feeding.
4. Too many fences subdivide land, making it difficult for mechanization.
5. Fences can prick and cause injury to animals.

**Types of fences**

1. Live fences or hedges

**Common plant species used for this purpose include**

1. Kie apple
2. Acacia
3. Cypress trees
4. Cactus (opuutia spp)
5. Sisal
6. Gum trees
7. Mountainous thorn
8. Tick berry (lantana camera)

**Advantages of live fences (hedges)**

* They are long lasting
* There are no risks of termite damage or rotting.
* They are quite cheap to establish.
* They add beauty to the farm.
* They act as wind breaks
* They are quite easy to maintain once established
* They usually serve as a source of wood fuel for farmers after trimming.

**Disadvantages of hedgers.**

* They take long to establish.
* They are easily destroyed by pests, diseases and fire.
* They require adequate protection to facilitate their establishment when still young.
* Hedges compete with crops for nutrients, space, sunlight, and water.
* They often lack continuality hence necessitating gap filling.
* They are a breeding ground for rodents, vectors, and snakes
* Hedges require a lot of Labour in terms of maintenance e.g. trimming and pruning.
* Their establishment is affected is affected by soil fertility and the climate.
* Thorns can pick and hurt animals, thus reducing quality of hides and skins
* Some shrubs like kie apple and lantana camera are poisonous to livestock.

**Dead fences.**

**These include;**

* 1. Wooden fence
	2. Trenchers
	3. Wall fences
	4. Electric fences
	5. Barbed wire fences

**Wooden fences.**

Wooden is a common material used for making both wooden and wire fences.

**Advantages of using wood for fencing.**

* 1. Wood is strong and durable if well treated.
	2. It is relatively cheap to buy.
	3. Wood is always available in most parts of Uganda.
	4. It can be easily worked into any shape without much skill and difficulty.
	5. Wood can be well painted for better appearance.

**Disadvantages of using wood**

1. It easily be destroyed by termites and others insects.
2. It is easily destroyed by fire
3. It can decay due to fungal attack and dampness
4. Weather elements like rain, wind or temperature can affect it.
5. It gets damaged when baddy seasoned or treated.

**Sources of wood for fencing**

* Natural forest.
* Planted forest
* Local shrubs and bushes
* Imported woods

**Treatment of wood for fencing**

**Seasoning:-** It is the drying of fresh wood by allowing air to pars over it.

**Precaution taken when seasoning wood**

* 1. Wood should be well sheltered to keep off rain and sunshine
	2. Timber should be heaped in intake and supported off ground to avoid dampness and allow air circulation
	3. All supports should be closely spaced to bear the weight of the timber and avoid bending or warping.

**Chemical treatment of wood**

Chemical that can be used for this purpose are.

* Penta chlorolo phenol
* Old engine oil
* Dieldrine
* Arsenic pentoxide
* Sodium dichromate
* Tar
* Creosote etc

**Methods of chemical wood treatment**

**These include;**

1. Vacuum/ pressure treatment
2. Soaking methods (hot and cold soaking)
3. Sap displacement (end diffusion) methods
	1. **Vacuum/ pressure treatment**

In this method, timber is peeled and tightly packed in a large cylinder, where the chemical (preservative) is forced into the wood at high pressure.

The chemical enters every part of the timber. The method is very effective and required special equipment.

* 1. **Soaking methods**
1. **Hot soaking:-** Freshly cut and peeled poles are submerged in a container containing the preservations.

The container is then heated until the preservative is about to boil, then heat is removed and timber allowed to cool down in the preservative.

The wood cells that expanded during heating now shrink during the cooling process and draw up the preservative.

1. **Cold soaking:-** The posts are submerged in the cold preservative for 2 or 3 days to allow the chemical to be slowly drawn into the conducting tubes of wood.
	1. **End diffusion (sap displacement) method**

In this method, freshly cut posts are peeled and immediately packed, with their bottom ends dipping in the chemical contained in a vessel.

After about 10 days, they are turned to submerge the ends also in the chemical until the chemical is taken in sufficiently.

The method is called sap displacement because the preservative is drawn up into the wood by displacement of the sap that dries out through the transpiration stream.

**N.B:-** It’s thus necessary to submerge the wood just within 2 hours after cutting before the sap dries up.

1. **Trenches**

A deep trench (ditch) is dug along the perimeter of the farm land. Trenches are commonly used in areas near national parks or game reserves where wild animals are a problem.

**Advantages of trenches**

* They are not difficult to maintain once established.
* Their establishment does not involve special technical skills.
* It’s a cheap way of preventing wild game.

**Disadvantages**

* Digging the trenches is expensive and laborious.
* High leaping animals cannot be restrained.
* Trenches can act as breeding ground for mosquitoes and snakes.
* The domestic animals may drop inside and get fractured.
1. **Electric fences**

This is made of conducting material, where a low voltage is usually set to provide a simple electric shock to animals that come into contact. Electric fences are common on farms where strip grazing is practices.

**Advantages**

* Its effective to cattle and goats
* It allows for adequate control of animals in strip grazing.

**Disadvantages**

* Initial installation cost is very high.
* The cost of maintenance is also high.
* It’s inefficient in case of power failure.
* It does not effectively restrain wool coated animals such as sheep and some goats since their coast are insulators.
1. **Wall fences**

These are constructed using bricks or blocks joined with motar.

**Advantages**

* They give maximum security and privacy.
* They are long lasting.
* They are resistant to pests, weather and fire.
* They are cheap and easy to maintain once established.

**Disadvantages**

* They require technical expertise in construction.
* The construction material is very expensive.
1. **The barbed wire fence**

These are the most common fences found on farms in East Africa. They have lines of wire (strings) usually 3 – 6 and supported on wooden posts.

**Types of barbed wire**

* + 1. **Low tensile barbed wire:-** This is always thicker in diameter and is more brittle. Its spines are usually blunt.
		2. **High tensile barbed wire:-** Its spines are always sharp and small.

**Components of a barbed wire fence**

(Leave space for the diagramme)

* 1. **Strainer or king posts:-** These are large posts, 2.2m high, 15cm diameter, and usually set 75cm into the ground. They are usually set at comers and gate

The purpose of the strainer is to strain or pull the wire in the required direction.

* 1. **Standards or intermediate posts:-** These are 1.7m high, 10cm diameter and usually set 60cm into the ground. They are usually set at 4.5 – 6m intervals.

The purpose of the standard post is to hold up wires between strainers.

* 1. **Struts or supporters:-** These are used to support or prop the strainers into the ground.
	2. **Droppers:-** These are wooden pieces 3 – 4cm diameter, supported on strands at 1 – 2m intervals. They don’t touch the ground.

The purpose of the dropper is to keep the spacing between strands.

**Fence construction**

**Equipment:-** These include; tape measure, wire strainer, hole diggers, wire pliers, claw hammers, pegs, staples, mallet, twine, nails, posts and wires.

**Procedure**

* 1. Ensure that the land to be fenced is the right one.
	2. Clear the land where the fence line is to pass to a width of about 2m to allow ample working space.
	3. Identify the corners of the area and use pegs to locate these positions.
	4. Make straight lines from corner to corner using twine.
	5. Fix comer and gate posts with their struts, taking care of foot paths. Strainers should be fixed 200m – 400m intervals along straight lines.
	6. Fix the standards at 4.5 – 6m intervals, setting them 60cm deep.
	7. Fix wires, starting with the bottom strand. The numbers and spacing of strands depends on the size of animals to be confined.
	8. Fix the droppers on the strands at intervals of 1 – 2m.

**Determination of quantity of fencing material**

1. **Number of posts**

 = Fence perimeter

 Spacing between

**N.B:-** For struts, each corner post requires 2units while each gate requires 4 posts, each with one strut.

Thus Number of struts = (2 x Number of corner posts) + (4 x Number of gates)

1. **Number of rolls of barbed wire**

 = Perimeter x number of strands

 Length of 1 roll of wire.

1. **Number of staples** = Number of strands x number of posts.

**Example**

Mr. Kirevu is to fence his rectangular farm with 4 more strands. The farm is 2000m long and 1000m wide. He wants to fix 3 gates if spacing between corners and gates.

**Calculate**

1. Number of posts required along the normal fence line.
2. Number of struts required.
3. Number of rolls required, assuming/ roll is 600m long.
4. Number of staples required.

**Solution**

1. Number of posts = Perimeter

 Spacing

Perimeter = (1000 x 2) + (2000 x 2)

 = 2000 + 4000 **= 600m**

Thus number of posts = (6000)

 15

 = 400

 **= 400 posts**

1. Number of struts = (2 x Number of coner posts) + (4 x Number of gates)

 = 2 x 4 + 4 x 3

 8 + 12

 **= 20 struts**

1. Number of rolls = Perimeter x Number of strands

 Length of 1 roll

 = 6000 x 4

 600

 **=** **40 rolls**

1. Number of staples = Number of strands x Number of posts

 = 4 x 400

 **= 1600staples**

**The cattle dip**

This is an animal handling structure used in the control of external parasites such as ticks by dipping.

**Structure and parts of the dip**

**(leave space for the diagramme)**

**Parts of the dip**

1. **Collecting yard:-** It is a spacious place where animals collect before dipping.
2. **Foot bath:-** It’s a shallow depression, (15cm deep and 35cm wide), filled with copper drugs to cleanse the feet of animals before dipping. This prolongs the strength of the dip wash.
3. **Entrance race:-** It can have 2 or 3 steps or not at all. Its 4m long and 1m wide. It provides a point at which animals plunge into the acaricide.
4. **The dip tank:-** Its 5m long, 205m at the deepest and 1.6m at the shallowest point. Its where the acaricide is contained.
5. **Splash walls:-** These are walls on sides of the tank. They return acaricide splashes back to the dip.
6. **Cat walk:-** It’s a floor between splash walls and other supports of the roof on which the farmers stand to observe the dipping process.
7. **Roof/ shed:-** It prevents excessive evaporation of the dip wash and keeps off rain water from diluting the wash.
8. **Exit ramp:-** It has got up to 12 steps rising from the dip bath. It lets animals out.
9. **Drainage race:-** It’s the passage of animals from the exit ramp. Its long and slopping towards the exit ramp to facilitate easy back flow of acaricide dripping from animals.

**Examples of acaricides used as dip wash**

1. Garmmertox
2. Toxaphane
3. Decetix
4. Delner
5. Bimatranz
6. Tsetse tick
7. Cooper tox
8. Supons
9. Supar mix
10. Supona extra

**Essentials of a cattle dip**

1. It should be sited on a well drained land with ample space for animal handling.
2. It should be near a permanent water source.
3. All floors should be concrete for easy cleaning and avoid muddy conditions.
4. The dip tank should be well roofed to keep off rain water and reduce excessive evaporation.
5. It should be well fenced for protection when not in use.

**Precautions taken when dipping animals**

1. Dipping is best done in the morning when the weather is still cool.
2. Animals should be watered before dipping or else they will drink the poisonous acaricide.
3. Before dipping, the foot bath should be clean and filled with fresh copper drugs.
4. The correct concentration and level of acaricide should be ensured before and during the dipping.
5. Sick, weak and terminally pregnant animals should not be dipped. They should only be sprayed.
6. Ropes should be at hand as to pull out animals that would collapse in the dip.
7. One animal should be allowed to enter the dip at a time.
8. Adult animals should be dipped separately from heifers.

**Advantages of using the dip**

1. Large volumes of acaricides enable handling of many animals in a short period of time.
2. The dip wash can be used several times once its concentration is maintained.
3. There is no wastage of acaricide.
4. On immersion, the acaricide reaches every part of the animal.
5. It requires less technical skill to carry out the dipping process.
6. The dip is quite cheap to maintain once established.

**Disadvantages of the dip**

1. The initial cost of construction is very high.
2. Sick and pregnant animals cannot be treated.
3. Much labour is required when filling and emptying the wash manually.
4. There is a risk of leakage of the wash in case of crack at the base and in the walls of the tank.
5. The wash tends to get too dilute as many animals are allowed through the dip.
6. Bacterial and virus diseases can accumulate in the dip and be transmitted to animals.

**Factors that can reduce effectiveness of dipping**

1. Failure of the farmer to follow the dipping routine.
2. Use of a wrong concentration of acaricide, usually too weak.
3. Poor mixing of acaricide which may not achieve uniformity of the mixture.
4. Dipping on a rainy day and rain water washes off the acaricide before it dries on animals.
5. Leaking roofs may lead to dilution of acaricide lowering effectiveness.

**The cattle crush**

It’s a structure used for confining animals when carrying out different operations.

**Designs of a crush**

1. **The ‘V’ Shape**
2. **The “H” Shape or continuous**

**Essential of a good crush**

* It should be sufficiently strong to restrain any animals put inside.
* The space should be limited not to allow more than one animal to enter.
* It should facilitate use of minimum labour when handling animals.

For effective handling of an animal, the head should be well secured on to a bar or the nearest post.

The crush should have a concrete floor built to a height of 0.6m on either side.

**Reasons for a concrete floor**

* It enables easy cleaning.
* It is durable.
* It with stands heavy damage due to tear and wear.
* It protects animals feed from injury.
* It avoids muddy conditions.

**Uses of the crush**

Used to confine animals during these operations

* Spraying
* Vaccination
* Drenching
* Artificial insemination
* Castration
* Dehorning
* Milking
* Identification

**The spray race**

It is an enclosed structure in which animals are expected to a dense spray of acaricide delivered at high pressure from a system of appropriately arranged nozzles.

The solution of acaricide is drawn from a reservoir by pump operated by an external power source.

**Components of a spray race**

* Collecting yard
* Spray pipe system
* Guide rails
* Pump
* Side Walls
* Jump (reserviour)
* Drainage race

**Advantages of a spray race over a cattle dip**

1. It can treat more animals at a time than the
2. It can spray small stock e.g sheep and goats.
3. Pregnant, sick and weak animals can be treated.
4. It uses only a small quantity of acaricide that can be made each day.
5. It’s cheaper to install than the dip.
6. Less labour is used in the operation.
7. The acaricide is always fresh and of high concentration.

**Disadvantages of the spray race**

1. It requires better technical skill in the maintenance.
2. It can’t operate without a power source.
3. There’s wastage of the acaricide.
4. Nozzles are always blocked with dirt, reducing its efficiency.

**FARM BUILDING AND CONCENTRATION MATERIALS**

These are enclosed roofed structures built on the farm.

**Benefits of farm buildings**

1. They increase production by decreasing crop and animal losses due to rotting, pest and fungal attack.
2. They increase on the quality of farm produce.
3. They protect farm tools and machinery from bad use that would cause rusting.
4. They protect sick, young and weak animals from bad weather.
5. They facilitate practices like zero grazing and other intensive methods of livestock grazing.
6. They facilitate storage of crop products when prices are low and sell when prices increase.
7. They facilitate proper storage of farm input such as insecticides, fungicides and fertilizers before they are used.
8. They increase security of farm produce against thieves and wild animals.
9. They reduce disease transmission on the farm by vectors like tsetse flies.

**Materials used for construction of farm buildings**

1. **Wood:-** Used as timber for poles, purline, beams etc. it is also used as shatters for doors and windows.
2. **Motar:-** It’s a mixture of cement and sand in ratio of 1:3 or 1:4 with water added. It helps in binding bricks or blocks during construction.
3. **Concrete:-** A mixture of sand, cement and gravel strong concrete, then 1:2:4 for floors. Where reinforcement is required, steel bars are put to make beams.
4. **Metal:-** It can be used inform of bars, pillars, poles, pipes, nails, netting frames and roofing sheets.
5. **Blocks:-** It’s a mixture of cement, sand and gravel in a ratio of 1:2:3, used in making walls and foundations.
6. Others include bricks, thatch, bamboo etc.

**Major components of a farm building**

1. Floor and foundation
2. The wall
3. The roof
4. **Floors and foundation**

**Procedure of making a concrete floor**

1. Lay hard core (big hard stones) when the foundation comes to the ground level.
2. Lay a binding layer of sand on top of the hard core and compress it well to get rid of empty spaces.
3. Pour concrete or ratio 1:2:4 on top of the sand layer.
4. Add a layer of cement/ sand mixture (ratio 1:8) on top of the concrete layer and introduce a little water to make it damp.
5. If the floor is to be smooth, put only a coat of wetted cement, finishing it with a steel float.

The floors of most farm buildings are lower completed with rough finish to avoid sliding.

**Procedure of making a foundation**

1. Prepare the site by removing all vegetation, trash and tree roots.
2. Make the necessary measurements according to building plan.
3. Locate the outline of the building using pegs/ strings.
4. Dig a trench 35cm wide and about 60cm deep all round.
5. Lay hard core (stones) in the trench.
6. Mix concrete (cement, sand, gravel) in ratio, 1:3:6 or 1:2:3 and pour on top of hard core in the trench all round.
7. Lay the bricks (wall construction) on top of the dry concrete using motor of ratio 1:6 to join the bricks. The foundation (plinth) wall should be raised to a level of about 15cm above the ground.

**Other important features of the building**

1. **The damp course paper. (D.C.P)**

Its thick, rough sheet usually placed on top of the foundation wall before construction of the main wall.

**Importance of D.C.P**

* It prevents termite filtration into the main wall.
* It cuts off moisture (dampness) from the ground.
* It improves durability and strength of the main wall.
1. **The lintet**

It’s a bar of steel – reinforced-concrete (mix 1:2:3)

Established just above windows and doors, to form a connection through the wall units

**Importance**

* It form a loop that colds the wall of the building together.
* It strengthens the wall against tensional and compressional forces from all dides.

**TYPES OF FARM BUILDING**

1. Crop store
2. Animal houses
3. Tools and equipment stores
4. Farmers house
5. Garage

**Crop store**

**Importance of crop store**

* They reduce tosses due to pests
* They reduce losses due to environmental hazards e.g. rain and humidity
* Facilitates prevention of crop produce till prices become reasonable.
* Facilitates easy inspection of crop products
* Make food available throughout the year.

**Common problems associated with crop storage.**

* Lack of proper storage facilitates
* Lack of proper seed dressing techniques
* Insects and rodent damage
* Deterioration due to rotting and fungal attack
* Poor construction of crop store.

**Desirable features of a good crop store**

1. Should be raised about 50cm above ground to avoid deepness.
2. All pests, pillars and wall should have smooth surface.
3. It should be made vermin proof e.g. by use of deflection
4. It should be well roofed and leak proof.
5. It should be positioned where there s’ security from thieves, wild animals.
6. All part should be accessible for easy cleaning.
7. It should be established on a firm well drained ground.

**Essentials of a good calf house**

* It should be on a well drained site
* It should have good ventilation.
* It should have a good supply of sun light.
* The roofing should be proper to protect animal from rain

**Qualities of clean water**

* Should be free from suspended sediment
* Should be very clear
* Should be free from odors and taints
* Should be from pathogens e.g. bacterial, fangs and protozoa
* Should free from toxic chemicals like pesticides, herbicides and fertilizers

**Treatment of water**

1. **Sedimentation:-** Water is allowed to pass through large quantities of sand to filter out the sediment before it is used.
2. **Addition of chlorine:-** Chlorine in form of hypochlorite can be added to kill pathogens.
3. **Copper soleplate** can be added to check liver fluke infection in livestock drinking water.

 **Maintenance of form water supplies**

1. All ponds, springs and wells should be lined with concrete or brick wall to avoid contamination.
2. Urine and all other animal water should be well disposed to avoid contact with water bodies
3. All water sources should be kept free from pesticide, herbicides or any other farm chemicals.
4. All open water reservoirs such as ponds should be well cleared of the surrounding vegetation.
5. All water pumps should be kept in good working condition e.g. should be lubricated and fueled.
6. There should be regular cleaning operation of all the water storage facilitates.
7. Any cracks in water systems like pipes, ponds, wells and dams should be checked and repaired.
8. There should be proper sewage disposal in all farm units.

***END***

ALL THE BEST FROM THE AGRIC DEPARTMENT