

## **FARM MACHINERY**

Farm machines are the different types machines and implements used in the farm. They are labor saving devices. Examples of those farm machines are tractors, bulldozer, harvesters, shellers, sprayers, incubator, mixing mill e.t.c. Among these farm machines, tractors are the most important and versatile machine (i.e capable of doing many work).

### **ADVANTAGES OF FARM MACHINES**

- 1) Farm work become more tedious and devoid of drudgery.
- 2) It makes farm work to be accomplished in short time.
- 3) There is increase in farm size.
- 4) There is increase in production.
- 5) Some operations can be combined into one.
- 6) Farm machines allows farmers to be able to do other works.

Let examine some of these farm machines.

### **TRACTOR**

This is a powerful multi-purpose motor vehicle used in the farm. It is driven by diesel or petrol engine. It has internal combustion engine with either two or four stroke power is transmitted through the power take off (P.T.O) shaft or by means of a moving belt connecting the tractor to another machine. Some brands or models of tractors include David Brown model, Massey Ferguson, 165 & 135, Ford model 4000, 5000 and fait of which are various models.

### **THINGS TO BE CONSIDERED BEFORE CHOOSING TRACTORS FOR FARM USE**

- 1) It should have a hydraulic lift and a line power take off system.
- 2) It should have sufficient ground clearance.
- 3) If it is to be the only tractor on the farm, it must be a general purpose kind of tractor.
- 4) The tractor should be have enough power for the job ,it is intended to do.

### **TYPES OF TRACTORS**

Tractors can/may be classified based on the engine types, wheel type and engine power capacity.

(A). Engine type: There are two types which include:

- (i) Diesel or Injection type: This is the type that uses diesel oil and has no spark plugs. This is the most commonly used type of tractor.
- (ii) Petrol engine/carburettor: it uses petrol (gasoline), it has spark plug and found in low capacity tractors that are used in small horticultural and landscaping of erations.

(B) wheel type: It is classified based on the wheel type, we have

- (i) pneumatic tyre type
- (ii) crawler type

(C) engine power capacity: this is classified based on the power output (large power) of engine the power capacity determines the amount of work a tractor can do.

### **USES OF TRACTORS**

- (i) it can be used to apply pesticides, herbicides, plant crops and cultivate.
- (ii) It helps in carrying chemicals, fertilizers, manure within the farm.
- (iii) It can be serve as a means of transportation within the farm.
- (iv) For pulling other farm equipment such as planting, harrow, plough e.t.c.
- (v) For pumping water through the use of power take off.
- (vi) In a stationery position it can be connected to an electric motor to generate electricity.

### **MAINTENANCE OF A TRACTOR**

## 1. DAILY MAINTENANCE

- A. Check water level daily and top it when necessary.
- B. Remove all mud after daily work or before the day's of operation.
- C. Ensure the tyre pressures are balanced.
- D. Check the oil to know if it's due for change or it fill it up.
- E. Gauge the fuel level and fill if necessary
- F. Tighten all the loose bolts and nuts.
- G. Do not overload.
- H. Follow the manufacturer's instructions.
- I. Check the electrolyte level in the battery and top-up if necessary
- J. Check the hydraulic level

## 2. ROUTINE MAINTENANCE

- A. Lubricate all moving points
- B. Re-spray metal panets when necessary
- C. Change spark plug where applicable.
- D. Drain radiator water and refill as instructed by the manufacturer
- E. Adjust brake and clutch if necessary
- F. Replace worn out tyres and other parts as and when necessary
- G. When not in operation, park it on level ground under shade
- H. Follow the instructions of the manufacturer when carrying crankshaft oil and fitter

### PRECAUTIONS

1. Ensure each piece of implements is properly mounted before operation.
2. Avoid wearing of loose clothing when operating a tractor, preferably, wear an overall and boots
3. Ensure that the power take off shielder is properly fitted
4. Ensure you park under the shade when not in operation
5. Obey traffic rules

### FARM MACHINERY

#### BULLDOZER

It is a powerful machine with an internal combustion engine powered by diesel oil. They move on tracks and pushes a broad steel blade which is set across the front of the vehicle. They can work in difficult conditions such as slippery grounds, swramp, steep hills e.t.c.

#### USES OF BULLDOZER

1. It is used for clearing of thick bushes and felling of trees.
2. It is used for uprooting stumps.
3. It is used for leveling sloppy land.
4. It is use in constructing farm roads.
5. It is used for shifting large quantities of earth.

#### DISADVANTAGES OF BULLDOZER

1. It leads to loss of top soil.
2. It is so expensive in rural farmers.
3. It leads to destructions of soil structure.
4. It can cause soil erosion and water logging.
5. It leads to poor air & water intake by the soil.
6. There is compaction of soil.

NOTE: The care and maintenance of bulldozer is the same thing with that of a tractor.

Assignment: Draw a tractor and a bulldozer

### **FARM MACHINERY (CONTINUES)**

**SHELLERS:** it is a processing machine operated electrically, mechanically and manually. It comprises of

- I. A hopper: which is used in filling the crop into equipment.
- II. The shelling cylinder or beater: which rotate and beats the crops.
- III. Stationery plate/concave with slots against which the cylinder beats.
- IV. A winnowing device- which blows the chaff away from the grains.
- V. And a set of sieve that separate and sort the grains from the chaff

### **USES OF SHELLERS**

1. It is used for separating grains from the chaff in maize
2. It removes the outer covering from the nuts as in groundnuts
3. It can shell grains of between 10% -13% moisture content
4. It can either be spring or cylinder sharp

### **MAINTENANCE**

- I. Clean the parts after use.
- II. Tighten all bolts and nuts.
- III. Lubricate all movable parts most especially in mechanically and manual type.

IV. Store under a shade when not in use

NOTE: Always make sure you do not put your hand beyond the hopper while leading a running sheller

## **DRYERS**

This is an equipment which is used for reducing the moisture content in agricultural produce such as grains like rice, cow peas, e.t.c meat, cocoa, tuber and root crops & chips (yam, sweet potato, cassava). A dryer has a heat source which can be fired by fuel or electricity, drying chamber, a thermostat, thermometer and a farming device which blows out the vapor.

### **USES OF DRYERS**

1. It can be used for drying vegetables and fruit.
2. It help to reduce the moisture content of stored products.
3. It is used for drying meat, curing and tanning of leather and tobacco.

## **MILKING MACHINE**

It is an equipment used for extracting fresh milk from the udder (breast) of dairy animals, most especially cattles. It has a device called PULSATOR that is applying a stimulus to the tert of the udder enable the milk to be let down from the udder. This is to prevent swelling of the teat & for comfortibility of the animal daring milk .

### **MILKING MACHINE CONSIST OF THE FOLLOWING**

1. A vacuum trump
2. Tears cups
3. Collecting pipe and containers

### **IMPORTANCE OF MILK**

- a. Baby food is gotten from milk
- b. It very rich in protein
- c. Butter, yogurt e.t.c are derived from milk
- d. Foster calves can be raised through milk

### **EQUIPMENT USED IN DAIRY FARM**

- I Feed trough
- II Water trough
- III Balers
- IV Buckets
- V Burdizzo
- VI Milking chute
- VII Fouage driers

### **TYPES OF MILKING MACHINE**

1. Line Releaser Milking Machine: This is more favored than the buckets type because it requires less labour and can conveniently be used where thre large numbers of animals to be milked and where skilled labour is required also it is expensive to install, but it remains the best especially where cows are managed out doors through-out the years.
2. Bucket Milking Machine: This is only used where milking is done indoors.

### **PRECAUTIONS**

- I. Sterile the machine before and after use.
- II. Ensure there is no leakage or loose connection before use.
- III. The animal to be milked has to be cleaned before milking.

IV. Milking must be done in a clean environment

V. Stop milking as soon a milk flow ceases

### **MAINTENANCE**

A. Ensure you wash with hot water and dry after use to avoid milk contamination.

B. Repeat the same process before operation.

C. Make sure all the pipes are neither blocked nor leaking.

## **FARM MACHINERY (CONTINUES)**

### **INCUBATORS**

This is an equipment used for hatching eggs into chicks. Fertilized eggs of chicken takes twenty-one days while that of turkey takes twenty-eight days and that of a goose takes three days. In the fact eighteen days the eggs are kept in the shelter at 37<sup>0</sup>c (degree celcius) and 39<sup>0</sup>cin the hatcher for the remaining three days until they are hatched in an incubator, correct relative humidity to prevent moisture loss from egg proper air circulation and egg turning is required. Eggs turning is automate in electric incubator but egg turning is done by hand in kerosine, incubator, and this must be done at least four times daily.

### **IMPORTANT/NECESSARY PARTS OF INCUBATOR**

1. Candler: This is used to test the fertility of eggs
2. Turner: For turning eggs at an hour interval
3. Setter: This is a platform where the eggs stay from the first day to the eighteen day of incubation
4. Trolleys: For setting eggs
5. Hatcher: This is a platform where eggs stay from nineteenth to twenty-first day of incubation
6. Heater: It supplies energy
7. Thermostat: It helps in temperature regulations
8. Hydrometer: It helps to regulate relative humidity which is usually set at 60%
9. Alarm: To notify someone if there is a deviation in the temperature & relative humidity which is used to mark the end of incubation

### **PRECAUTIONS**

1. Before setting the eggs, run the incubator for 12 to 24 hours
2. A temperature of 37-39<sup>0</sup>c should be maintained
3. Relative humidity at 50%-70% with an optimum of 60% should be maintained
4. Make sure there is good ventilation
5. Disinfect the incubator after hatching a batch

### **HINDERANCES TO EFFICIENT FUNCTIONING OF AN INCUBATOR**

1. Poor ventilation
2. Irregular power supply
3. Leakage in insulator- This may be due to ageing or poor handling. It causes poor hatchability and loss heat
4. Malfunctioning of thermometer
5. Malfunctioning of the turning device- It can be caused by loose nuts or stiffness or movable parts

6. Malfunctioning of fan- This can be due to loose nuts or lack of lubrication of movable part
7. Malfunctioning of thermostat- It can be as a result of fluctuations in power voltage
8. Dry humidifier- When this occur, there is low humidity and death of embryo which can be as a result of excessive heating or leakage

**ASSIGNMENT** :Draw and label an incubator

### **TRACTOR COUPLED IMPLEMENT**

Tractor coupled implement can be defined as the implement that are usually attached to the tractor.They are plough , harrow, ridger, planter, harvester, and sprayer.

Plough can be defined as a primary tillage or soil cultivation implement used in land preparation. There are two types of plough.

1. Mould board plough: Is a type of plough used in temperate region where the soil is free of rocks, tough plants, roots, and where the soil is soft. The mould board plough contain the mould board certain the mould board and landside.
2. Disc plough: This plough is used in the topic where the soil is tough and stone and rocks and plant roots round .The disc plough contain the beam, beam cap , disc scrapper, disc and furrow wheel

#### **FUNCTION OF PLOUGH**

1. It helps it turn the soil to form clods or lumps
2. The clods or lump acts act as wind breaker
3. Erosion can also be prevented though plough
4. It help to increase operation
5. Weed control is possible
6. Drainage and percolation are encouraged
7. This helps to increase detration and drainage

### **HARROW**

Harrow can be defined as a secondary tillage implement. It is used immediately after the plough

#### **TYPES OF HARROW**

1. Disc harrow: It breaks down big soil clods after ploughing
2. Spring fine: It is for cultivation of light soil
3. Activators: It drags root and stone from the ground
4. Spike tooth harrow: It is used in weeding the farm

#### **DIFFERENCES BETWEEN A DISC PLOUGH AND DISC HARROW**

1. The disc plough are very large in size while the disc are small in size
2. The space between each disc plough is very wide while the space between each disc harrow is very narrow
3. There is a single gang disc plough while harrow has one or two pairs of gangs
4. Large soil clouds are produced in disc plough while small of soil cloud in disc harrow
5. Disc harrow is cheaper while disc plough is very expensive to buy
6. Disc plough is for primary soil tillage of while disc harrow is a secondary soil tillage implement

### **RIDGER**

Ridger can be defined as an implement used after ploughing and harrowing have seen completed

They are divided into the disc ridger and the mould board ridger

#### FUNCTIONS OF RIDGER

- 1) For preparing ridges for planting
- 2) It prevents weed growth and erosion
- 3) It promotes soil aeration
- 4) It enables roots of crops to penetrate well
- 5) Harvesting of root crops is easy
- 6) Percolation of water is easy

#### PLANTER

Planter can be defined as an implement for planting of seeds and to measure spacing distance and planting depths

#### TYPES OF PLANTERS AND THEIR USES

- (1) Broad casting planter: It scatters the seeds above the field randomly
- (2) Drilling planter: Makes the correct number of holes and takes into consideration the space between rows and also planting depth
- (3) Precision planter: Places the correct number of seeds in a hole, taking into consideration within and between holes and the depth
- (4) Row planter: is designed to plant seeds in along the rows in ridges
- (5) Broadcast planter: is designed to plant seeds by random scattering of seeds

#### HARVESTER

Harvesters can be defined as an implement used to harvest mature and ripe crops

#### TYPES OF HARVESTERS

1. Mower forage: Is designed to harvest, lay, chop grass from the rows. It is mounted on a tractor
2. Forage harvesters: Is designed to harvest and chop green row crop like maize for silage
3. Corn picker: Is designed to pick off the mature maize cob or ear without rows
4. Combined harvesters: Help to separate grains from chaff and straw as a machine designed for the spraying of agro-chemicals in the farm

#### TYPES OF SPRAYERS

- 1) Knapsack sprayer
- 2) Helicopter mounted sprayer
- 3) Tractor mounted sprayer

#### FUNCTIONS OF SPRAYERS

1. To spray insecticides to eradicate insects
2. To spray disinfectant on livestock
3. To spray herbicides on weeds
4. To spray liquid fertilizer

#### MAINTENANCE OF SPRAYERS

1. Wash properly with water to eliminate the left over chemicals
2. Turn it downward after use
3. Keep in a cool and dry place