

FERTILIZERS AND MANURES.

A **fertilizer** is a substance which when applied to the soil, it increases the level of plant nutrients in the soil.

They are broadly classified into inorganic fertilizers and organic manures/fertilizers.

ORGANIC MANURES/ FERTILIZERS.

Organic manure is got from plant and Animal materials that have decomposed.

The decomposition process is possible with the help of micro organisms found in the soil.

Advantages/ benefits of using organic manure.

- ❖ They control Soil erosion by binding soil particles together.
- ❖ They increase the activities of soil living organisms.
- ❖ They give soil a dark colour which absorb sunlight.
- ❖ They encourage water infiltration/ percolation into the soil.
- ❖ They buffer soil PH.
- ❖ They improve soil aeration by increasing the number of pores in the soil.
- ❖ They improve on the workability of the soil.
- ❖ They are sources of organic acids that aid weathering.
- ❖ They improve on the water holding capacity of the soil.
- ❖ They supply the soil with all the required nutrients.

Disadvantage of organic manures.

- ✓ They cannot be used on a large scale because they are bulky.
- ✓ They have many plant nutrients but in small quantities.
- ✓ They are sources of weeds.
- ✓ They are sources of pests and diseases like rats.
- ✓ They take long to release plant nutrients.
- ✓ They have nutrients in unknown amounts.
- ✓ Produce an irritating smell.
- ✓ If used before complete decomposition, they produce a lot of heat that can burn crops.
- ✓ They are difficult to transport because they are bulky.
- ✓ They require large volume of water during processing eg. Compost manure.

TYPES OF ORGANIC MANURES.

They include; Green manures, farm Yard manure, compost manure and organic mulches.

A). GREEN MANURE.

This is a type of manure which is prepared from Green plants by ploughing and incorporating them into the soil.

The plants to be used in making the manure are planted on a piece of land whose fertility is to be improved.

Before the plants flower, they are planted and buried into the soil. When they rot, they form manure.

PREPARATION OF GREEN MANURE.

- The plant/ crop to be used for green manure is planted in the garden.
- It is given time to grow up to flowering stage.
- Towards flowering, the crop is incorporated into the soil by ploughing.
- It is then given time to decompose for a period of 2 weeks.
- After this, the garden is prepared for the planting of the main crop.

Characteristics of a good plant for green manure.

- ★ It should have a fast growth rate.
- ★ It should be able to decompose and rot quickly.
- ★ It should have a high content of nutrients especially nitrogen.
- ★ It should be free from pest and diseases.
- ★ It should be easy to plough into the soil.
- ★ It should have abundant leaves.
- ★ It should be able to grow in relatively poor soils.
- ★ It should have deep roots to improve soil structure and nutrients recycling.
- ★ It should be easy to establish.
- ★ It should be preferably a legume.

ADVANTAGES OF GREEN MANURE.

- Speeds up bio chemical activities in the soil.
- Increases the organic matter content of the soil.
- It adds alot of nitrogen to the soil especially if legumes are used.
- It assists in weed control.
- Deep rooted crops improve soil structure.

Disadvantages of green manure.

- Most of the crops used are food crops and it is therefore hard for the farmers to plough them.
- Preparation of green manure may delay time of establishing the main crop.
- Most nutrients are used up during the decomposition process.
- It requires a tractor to cultivate) plough the plants into the soil which is expensive.
- It keeps pests and diseases on the farm.

- It interferes with the normal crop rotation program.
- It requires a lot of time and labour to make.

B). FARM YARD MANURE.

This is manure got from animal dung, urine and beddings got from animal houses eg, poultry houses, pig sty, kraals and rabbit house.

PREPARATION OF FARM YARD MANURE.

- Beddings are put in houses where animals stay.
- Animal urinate and defecate on the beddings.
- Beddings are left in the house until they are fully mixed with excreta.
- Beddings and excreta are removed and heaped on a concrete floor under the shade.
- The heap is covered with a layer of soil to prevent nutrients loss to the atmosphere.
- Allow all materials to decay for about 6 weeks.
- After the materials have completely decayed, it means that the manure is ready for use.

FACTORS THAT AFFECT THE QUALITY OF FARM YARD MANURE.

- Type of Animal kept ; non ruminants provide good quality manure than ruminants
- Types of beddings used ; straw beddings absorb urine more than wood shavings.
- Type of food given to the animal ; concentrates provide excellent manure than starchy feeds.
- Method of storage; manure stored under a shade has more nutrients than manure exposed to rain and sunshine since leaching and volatilization are controlled.
- Time ; manure should be given time to fully decompose. This should be about 6 weeks.

Advantages of using F.Y.M.

- It has a high content of nitrogen and phosphorus.
- It supplies a high amount of organic matter.
- Improves on the soil physical properties like structure.
- Improves on the quality of other manures like compost manure.

Disadvantages of F.Y.M

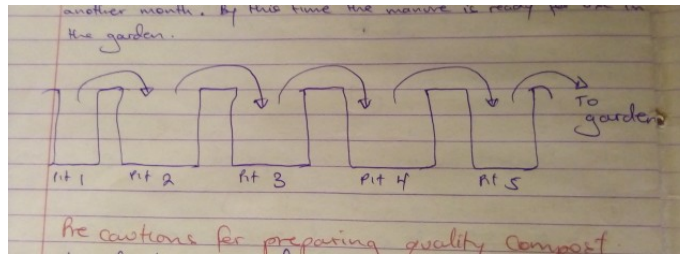
- It is difficult to collect animal droppings if animals are scattered.
- Urine is only collected when the floor is cemented and if the animals are kept indoor.
- Requires a lot of labour to collect the excreta.
- Has a bad smell.

C). COMPOST MANURE.

Compost manure is manure made from kitchen wastes and rubbish that can rot easily eg. left over food, peelings and rotten food.

manure
available

When
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because



Materials used to make compost depends on what might be in a home.

making compost manure, one take care to avoid the following they don't decompose.

- I. Polythene materials.
- II. Plastic pieces.
- III. Broken glasses.
- IV. E.t.c.

PREPARATION OF COMPOST MANURE.

Compost manure can be prepared using a pit or a heap method.

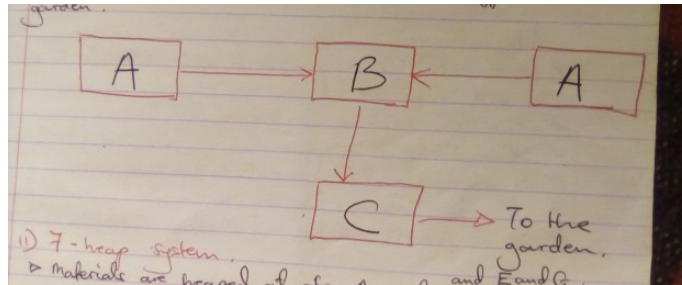
I) PIT METHOD (INDOOR METHOD).

- Dig five pits of about 150cm × 150cm × 60cm.
- The materials to make compost manure are arranged in the first pit in the following order : (ie it is from bottom to top).
 - ★ Dry hedge cuttings or maize stalks to trap nutrients and Allow aeration are put first.
 - ★ Fresh Grass, leaves and kitchen refuse or waste.
 - ★ Some farm Yard manure to provide micro organisms that break down the fresh materials.
 - ★ Wood ash or artificial fertilizers to improve nutrients content.
 - ★ Top soil to provide micro organisms.
- If the pit is not full, the order above is repeated up to when the pit fills.
- When the pit is full, it is covered with dry leaves.
- After 3-4 weeks, the materials in pit 1 are transferred to pit 2 and covered with leaves. More fresh materials are put in pit 1.
- After 3-4 weeks, materials in pit 2 are transferred to pit 3 and materials in pit 1 to pit 2.
- After a month, materials in pit 3 are transferred to pit 4, where it stays for another month.
- From pit 4, it's transferred to pit 5 where it stays for another month. By this time, manure is ready for use in the garden.

PRECAUTIONS FOR PREPARING QUALITY MANURE.

In order to prepare good manure, the following have to

- ★ Ensure constant the materials to uniform decaying.
- ★ Sprinkle water during to speed up the rotting.
- ★ Add old compost to provide micro organisms to speed up the rotting.
- ★ Add fertilizers to improve the nutrients content.
- ★ Cover the pits to reduce loss of nutrients through volatilization.
- ★ Remove materials that cannot rot eg, polythene, glasses and metal.



compost
be done.
turning of
enable
dry period
process of

How can you tell that manure is ready for use.

- ❖ When materials have fully decomposed.
- ❖ The materials reduce in volume.
- ❖ Temperature of the heap reduces.
- ❖ Materials develop a sharp smell.
- ❖ Fungi grow on the manure.

ii) HEAP METHOD.

Instead of using pits, the materials can be piled in heaps. There are two types of heaps ie. 4-heap system and 7-heap system.

a). 4 heap system.

Materials to compost are put at heap A where they stay for a month.

After a month, the materials are transferred to heap B where they stay for another month.

More fresh materials are put at heap A.

After another month, the materials at heap B, are transferred to heap C where they stay for one month.

When fully decomposed, the manure is applied to the garden.

b). 7- heap method.

- Materials are heaped at pits A, C, E and G for three weeks.
- After 3 weeks, materials from A and C are piled at point B and at the same time materials from E and G are piled at point F.
- After 3 weeks, the materials from B and F are transferred to D and they stay for 3 weeks.
- At point D, manure is ready to be applied to the garden.

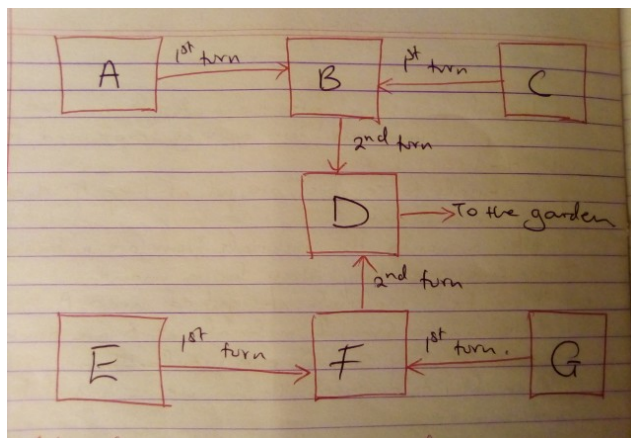
ADVANTAGES OF USING COMPOST MANURE.

- It is easy for every one to get materials to make compost manure.
- It is long lasting in the soil.
- It is cheap to prepare.
- It adds essential nutrients to the soil.
- It adds organic matter to the soil.
- It improves on the soil structure.

Disadvantage of compost manure.

- It requires a lot of labour to prepare.
- It is expensive to apply since it is bulky.
- It

- May
- It
- May farmer.
- Has a



supplies nutrients in unknown amounts.
be a source of pests and diseases..
takes long time to prepare.
cause health problems to a
bad smell.

D). ORGANIC

These are

MULCHES.

materials used for mulching.

Mulching is the covering of the soil surface with a layer of plant materials.

When plants are used for mulching, we refer to these materials as organic mulches. However, inorganic mulches/ materials like polythene paper may also be used.

Advantages of mulching.

- It improves water infiltration into the soil.
- Mulching controls weeds.
- It controls soil erosion by reducing the speed of running water.
- It conserves soil moisture and improves crop yields.
- Organic mulches add organic matter to the soil.
- Mulching controls soil temperature.

Disadvantage of mulching.

- Mulching encourage multiplication of pests since it offers hiding ground for pests.
- It requires a lot of labour to put mulches in the garden.
- Organic mulches cause mineral imbalances in the garden.
- Some mulches May be a source of weeds.
- They increase fire hazards in the garden.

INORGANIC FERTILIZERS.

These are plant nutrients that are manufactured in factories and usually supply specific essential elements to the soil.

Inorganic fertilizers contain both macro and micro nutrients that are needed by plants.

TYPES OF INORGANIC FERTILIZERS.

1. Straight/ simple fertilizers.

These supply the soil with only one primary macro nutrient. They include ;

- ★ Urea
- ★ SSP - single super sulphate.
- ★ DSP - double super sulphate.

2. Compound fertilizers.

These supply the soil with more than one major nutrient. They include ;

- ★ CAN - calcium aluminum nitrogen.
- ★ NPK - nitrogen pottasium and phosphorus.
- ★ DAP - do ammonium phosphate.

QUALITIES OF A GOOD FERTILIZER.

- They should be readily soluble in soil water to give a quick response.
- They should contain the required nutrients in right proportions.
- They should be easy to handle and apply.
- Should be easy to store.

- Should be cheap and affordable to farmers.
- Should have a long lasting effect in the soil.

Advantages of inorganic fertilizers.

- ✓ They are easy to apply because they are not bulky.
- ✓ They are easy to transport and store because they are not bulky.
- ✓ They readily supply the required nutrients to the crops.
- ✓ They can be applied at any stage of crop growth.
- ✓ They contain nutrients in known amounts.
- ✓ They have nutrients in large quantities.
- ✓ They supply the soil with specific nutrients.

DISADVANTAGE OF INORGANIC FERTILIZERS.

- ❖ They are expensive.
- ❖ They are easily leached and eroded.
- ❖ They can damage the crop if careless used.
- ❖ Their effect in the soil is short lived.
- ❖ They may change the soil PH
- ❖ They pollute the environment and the water source.
- ❖ They are poisonous to man and livestock.
- ❖ They don't improve on the soil structure like organic manures.

METHODS OF FERTILIZERS APPLICATION.

- A number of methods can be used to apply fertilizers in the garden. These include ;
- **Band placement** ; fertilizers are applied between rows of crops in strips or bands and then covered with Soil. The fertilizers should not be too near or too far from the crop.
 - **Spot application or base dressing or drilling** ; particular places/ spots are chosen and fertilizers applied in the spots next to the crops.
 - **Ring application** ; fertilizers are placed in a ring form around the crop and crops are able to absorb nutrients from all sides.
 - **Broadcasting** ; fertilizers are applied by scattering them in a prepared garden with hand or machine. Thereafter they are covered with some soil using a rake.
 - **Top dressing**; fertilizers are applied on the surface where crops are growing and it's mainly done to give a boost to growing crops. eg. NPK is applied to maize at knee height.
 - **Side dressing** ;. Fertilizers are placed in bands a few centimeters on the side of the crops after crop has established.
 - **Foliar application** ; here fertilizers to be applied are dissolved in water and sprayed to the leaves of crops. The leaves absorb the nutrients through the stomata.
 - **Plough sole** ; fertilizers are applied at ploughing time and mixed with the soil as ploughing takes place.
 - **Fertigation** ; the fertilizers are mixed with irrigation water and then applied together.

FACTORS AFFECTING CROP RESPONSE TO FERTILIZERS APPLIED.

The ability of crops to benefit from fertilizers applied depends on the following.

- ❖ **Amount of fertilizers applied** ; correct fertilizers rates should be observed, too much or too little fertilizers will affect crop growth.
- ❖ **Fertility level of the soil** ; if the soil is already fertile, there is no need of applying fertilizers because the crops will not utilize it.
- ❖ **Moisture content of the soil** ; moisture dissolve fertilizer elements which will be taken in by plants in solution form. Arid/ dry soils will not have water to dissolve nutrients.
- ❖ **Soil temperature** ; some fertilizers especially nitrogen fertilizers are affected by high temperature since it leads to volatilization.
- ❖ **Soil PH** ; it mainly affects availability of phosphorus. At low PH, phosphorus combines with iron and aluminum to form insoluble compounds, in this case, crops will not benefit from fertilizers applied.
- ❖ **Type of crop grown** ; legumes don't require nitrogen fertilizers because they are able to fix their own nitrogen, application of nitrogen fertilizers to such crops will not have any use.
- ❖ **Permeability of the soil** ; some soils doesn't allow water to spread and pass through easily, such soils will not allow fertilizers to infiltrate to the deeper layers.
- ❖ **Method of application** ; fertilizers should not be placed too near or too far from crops since some fertilizers may burn the crops.
- ❖ **Pests and diseases** ; these destroy plant leaves and roots which help in absorption of fertilizers.
- ❖ **Stage of crop growth** ; fertilizers should be applied at the right stage of crop growth.
- ❖ **Plant population.**
- ❖ **Nature of the fertilizers.**
- ❖ **Weed infestation.**

QUESTIONS.

1. How can a farmer ensure maximum effectiveness of fertilizers applied.
2. Describe the various methods of fertilizer application.
3. Why would you advise your head teacher to use organic manures.
4. Describe how you can prepare compost manure using the indoor method.
5. Explain the factors that affect crop response to fertilizers applied in the garden.

THANKS FOR ATTENDING.