

# **JOB ROLE – FLORICULTURIST (OPEN CULTIVATION)**

Sector – Agriculture

(Qualification Pack Code: AGR/Q0701)

PPT's for Class XI



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# **UNIT 5: PLANT NUTRITION AND IRRIGATION**

## **Session 2: Application of Manures and Fertilisers**

# Content

Title	Slide No.
Session Objectives	4
Introduction	5
Manure Application	6-7
Fertiliser Application	8-15
Bio-fertilisers	16-18
Summary	19

# Session Objectives

The student will be able to :

- Apply manures and fertilisers.
- Describe the bio-fertilisers.

# Introduction

To get maximum benefit from fertilisers and manures they should be applied at proper time in proper quantity and in the right manner.

The method of manure application depends on its type. Fertilisers are normally applied just before or soon after planting. The frequency and amount of application depends on the crop, soil and season.

# Manure Application

## Types of manure

### Bulky manures

FYM or other bulky manures should be broadcasted over the entire area and mixed well with the soil by harrowing. The application of manures depends on the season to avoid leaching of nutrients. In light rainfall areas, the manures may be applied during monsoon, whereas, in heavy rainfall areas after monsoon.

### Concentrated manures

Oil cakes, fish manure and bloodmeal manures should be applied well in advance because they are not available quickly as they have to be broken down by soil microbes and made available to plants.

# Manure Application

## Farmyard manure (FYM)

Well-rotten FYM can be applied just before sowing and partially rotten FYM has to be applied 20–30 days before sowing. Usually, 10–20 tonne per hectare FYM is applied.

The FYM should be preferably incorporated in the soil by deep ploughing or harrowing immediately. It improves the physical, chemical and biological properties of the soil.

# Fertiliser Application

## Time of application

Generally, organic manures are applied while preparing the land so that they improve the structure and water-holding capacity of the soil. Fertilisers are normally applied just before or soon after planting. The frequency and amount of application depends on the crop, soil and season.



# Fertiliser Application

## Application of fertiliser in solid form

It includes the following methods:

### Broadcasting

**Basal application:** Broadcasting of fertiliser is carried out prior to sowing and planting just before the last ploughing is incorporated in the field.

**Top dressing:** When fertilisers are broadcast in the standing crop, it is known as top dressing. In this method, usually, nitrogenous fertilisers and micronutrients are applied in dense spacing flower crop.

# Fertiliser Application

## Application of fertiliser in solid form

**Placement:** Place the fertiliser in well-prepared soil before sowing, irrespective of the position of seeds. There are two types of fertiliser placement techniques.

**Plough furrow and single band placement:** Application of fertiliser in narrow bands beneath and by the side of crop row/furrow is called 'band placement' of fertilisers. This method can be adopted

- when soil has low fertility,
- when fertiliser reacts with soil constituents leading to the fixation of nutrients.

# Fertiliser Application

## **Deep placement**

Generally, practised for the application of nitrogenous and phosphatic fertilisers and in paddy fields. It is commonly recommended in dry land agriculture.

## **Ring placement**

The quantity of fertiliser per plant is calculated and applied at some depth around the plant circle, this method is mostly practised in orchard crop.

# Fertiliser Application

## Application of fertiliser in liquid form

### Foliar application

It can be used with fertiliser nutrients readily soluble in water. It is also used when there is a soil fixation problem. In this method, it is difficult to apply sufficient amount of the major elements. Nutrient concentration of 1% to 2% can be applied without injury to foliage.



# Fertiliser Application

## Application of fertiliser in liquid form

### Fertigation

This application of fertilisers is through the irrigation water. Nitrogen is the principle nutrient commonly used for this purpose. Potassium and highly soluble forms of zinc and iron can also be readily applied this way.

Normally, this system is used through drip irrigation, and liquid fertilisers containing all three major nutrients are normally used.

# Fertiliser Application

## Green manuring

Some plants, after decomposing, add plant nutrients to the soil and improve the soil condition. Such plants are called 'green manure crops'. Manuring of the soil by this method is called 'green manuring'.

Some green manuring plants at immature or flowering stage are buried as a whole into the soil, while in some cases, only leaves are added to the soil. The leaves from trees and shrubs used as green manure are *Sesbania speciosa*, *Glyricidia maculata*, *karanj*, etc.



# Fertiliser Application

## Advantages of green manure

- It improves the soil structure.
- Due to slow decomposition, once applied, it releases gradually.
- It adds organic matter to the soil.
- It lowers the runoff and facilitates the infiltration of rainwater.
- Nutrients that otherwise may leach out are held up by plants.
- Leguminous crop when used as green manure fixes nitrogen to the soil through root nodules..

# Bio-fertilisers

Bio-fertilisers help to add, conserve and stimulate plant nutrients in the soil. They are preparations containing microorganisms, such as bacteria, fungi, and algae in sufficient quantity, helping plant growth and nutrition.

Following are the different types of bio-fertilisers.

1. Rhizobium
2. Azotobacter
3. Azospirillum
4. Blue-green algae
5. Azolla
6. Phosphate-solubilising microorganism
7. Mycorrhiza



# Bio-fertilisers

## Bio-fertiliser supplying plant nutrient

### Nitrogen

There are three types of nitrogen-fixing bacteria, besides a group of algae. They are:

- (a) Symbiotic nitrogen-fixing bacteria, e.g., *Rhizobium*
- (b) Associative nitrogen-fixing bacteria, e.g., *Azospirillum*
- (c) Free living nitrogen-fixing bacteria, e.g., *Azotobacter*
- (d) Free-living blue green algae, e.g., *Anabaena*, *nostoc*.

### Phosphorus

There are two types of phosphorus mobilising microorganism:

- (a) Phosphate-solubilising microorganism, e.g., Phospho-bacteria
- (b) Microorganism helping in phosphorus uptake, e.g., Mycorrhizal fungi.

# Use of Bio-fertilisers in Flower Crop

*Azotobacter*, *Azospirillum*, phosphorus solubilising bacteria (PSB) and Mycorrhiza fungi are applied in various flower crops, i.e., tuberose, rose, carnation aster, marigold and jasmine, etc. These bio-fertilisers not only have a limited role in improving the nutrient uptake by plants but also help in enhancing the quality produce of flowers along with reducing the cost of cultivation.

In India, commercial use of bio-fertilisers in flower crops is limited. It is used for research and academic purposes only.

# Summary

In this session you have learnt about the application of manures, fertilisers and bio-fertilisers.

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