

A close-up photograph of a person's hand sowing seeds into dark, rich soil. The hand is positioned on the right side of the frame, with fingers carefully placing a light-colored seed into the ground. In the foreground, several other seeds are scattered across the soil. In the background, numerous small, green seedlings with two leaves are growing in rows, indicating a well-maintained garden or seedbed. The overall scene is brightly lit, highlighting the textures of the soil and the vibrant green of the plants.

# Sowing/raising of seeds and seedlings

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# INTRODUCTION

- Since the past decades, agriculture plays a crucial role in the life of an economy.
- The entire world depends on agriculture for food. And so, agriculture is mainly involved in the production of basic food crops.
- There are certain parameters and different agricultural practices, which need to be followed for good quality and quantity of crop production.
- This is where the process of sowing helps.
- Seed sowing is a basic horticultural skill. Many flowers, trees, and vegetables are easy to grow from seed if we take a little bit of care. Minimal equipment is needed and all we need to do is provide the basic requirements for germination; warmth, moisture and oxygen.

# What is Sowing ?

- Seed sowing is the process of inserting the seeds inside the soil to provide favourable condition for its germinate, flowering and fruiting. Without sowing we can't produce food.
- It is one of the most basic and most important part of agriculture.
- During this agricultural process, proper precautions should be taken including the appropriate depth, proper distance maintained, and soil should be clean, healthy and free from disease and other pathogens including fungus.
- All these precautions are essential for seed germination – the process of seeds developing into new plants.
- People are growing plants by sowing form years. Over these period of time, Different research, studies and experiments were done to find out the different methods of seed sowing to reduce the labour use and give optimum return.



# What we need for sowing:

- the seeds themselves
- containers: you can use discarded plastic cups, trays or boxes
- seed compost (potting soil made especially for starting seeds)
- a spray mister (empty spray bottles are ideal)



# Steps for Sowing

- Harvest Seeds From Flowers and Vegetables
- Collection of Trays or Pots and Drill Holes If Needed
- Filling the Container With Sterile Seed Compost (Seed-Starting Potting Mix)
- Moistening the Surface of the Compost
- Sprinkle the Seeds Evenly Over the Compost
- Covering the Seed Tray and Place It in a Warm Spot
- Uncover the Seedlings Once They Germinate
- Transplant the Seedlings to Individual Pots
- Harden Off and Plant transferred to field.





# Methods Of Seed Sowing

## 1. Broadcasting

- This is the most common and primitive method.
- Broadcasting simply means spreading of seeds over the ground.
- It can be done either manually or by mechanically.
- While doing manually, We take seeds in our hand and spread uniformly (As uniform as we can) over the soil. After that planking is done. Some seeds are covered while some remain uncovered and seed distribution is also uneven.
- While, Doing by mechanically – Amount of seed to be broadcasted is controlled. This leads to the uniform distribution of seeds over the soil.
- It is also known as random sowing.



## **Advantages:-**

- ✓ Easy and cheap method.
- ✓ Saves time.
- ✓ Skilled labour isn't required.
- ✓ It is best for small seeds like that of mustard and rapeseed.

## **Disadvantages**

- ✓ As the seed rate/seed distribution isn't uniform, It leads to the germination of more number of plants in some place of field while other place may remain barren. This leads to the use of more labour in intercultural practices.
- ✓ All the seeds may not be covered by soil. So – Germination is poor and there is chance of lodging of plant during wind.
- ✓ Proper seed rate and spacing can't be maintained which ultimately reduce our production.

## 2. Traditional Method

- A tool is used to sow the seeds traditionally that is funnel-shaped.
- The funnel is filled with seeds and the seeds pass through two or three pipes with sharp ends.
- These ends enter into the soil and the seeds are placed there.





## 2. Drilling

- Drilling is more advanced method of seed sowing that allows the proper control over seed rate and spacing.
- In this method, seeds are sown in continuous flow in furrow made by machine and are immediately covered with soil.
- It is done by the help of drillers.
- Different kinds of drilling machine are available in market.
- They can be manually operated or even automated.
- There is also availability of seed cum fertilizer drillers that helps to put fertilizer along with seed sowing at once.
- From my point of view, this is best method as it also facilitates to make 2-3 rows at a time.



Automatic Seed Driller



Manual Seed Drillers

## **Advantages:-**

- ✓ Saves a lot of time.
- ✓ More control over seed rate.
- ✓ Rapid Germination.
- ✓ Seed are put in soil along with fertilizer.

## **Disadvantages:-**

- ✓ Costly.
- ✓ Technical knowledge is required.

### 3. Dibbling

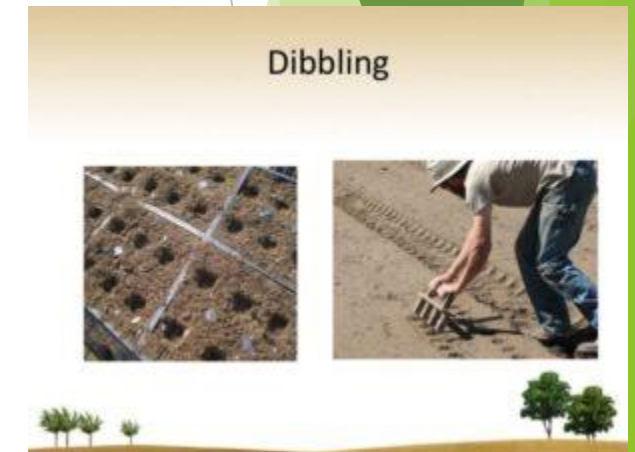
- Dibbling is commonly used for vegetable cultivation as it is time consuming for other crops.
- In this method, Holes are made earlier with the help of dibblers by maintaining proper depth and distance.
- After that, Seeds are placed in those holes and finally covered with soil.

- **Advantages:-**

- ✓ Proper depth, spacing and seed rate are maintained.
- ✓ Proper covering of seed leading to good germination.
- ✓ Less seeds required

- Disadvantages:-**

- ✓ Time consuming and Costly process.





## 4.Sowing Behind The Plough

- It is the conventional method of seed sowing.
- It is widely used to sow seeds of maize.
- In this world, a machine (Plough) makes furrow inland and a man behind it drops the seeds at particular spacing and proper seed rate.
- In general, A wooden Plough with a pair of bull are used for this method though other machines can also be used.

### **Advantages:-**

- ✓Easy and Cost effective method.
- ✓Proper spacing and seed rate can be maintained.

### **Disadvantages:-**

- ✓Time consuming and need more labour.



## 5.Hill Dropping

Hill can be understood as a place in field in which seeds are drop. There are certain number of hills in a certain field. These are made at a good distance but not continuously. In these hills, Seeds are dropped.

## 6.Check Row Planting

In this method, Exact row-row and plant-plant distance can be maintained. The machine used for this process is check-row planter.

## 7. Transplanting

In this process, the seedlings are first planted in nurseries and then planted in the prepared fields. It is usually done to grow vegetables and flowers. A transplanter is used for the purpose. But, this process is time-consuming. For Example:- Rice Transplanting.



# Precautions While Sowing the Seeds

There are a few necessary precautions, which need to be followed while sowing the seeds.

- The seeds should be disease-free.
- Seeds must be planted at correct distances from each other.
- Seeds should be sown such that all the crops should get an equal amount of light, nutrients, and water.
- Seeds should be sown at correct depths. They should neither be placed at the top of the soil so that it is blown away by wind and animals nor should it be sown too deep into the soil such that it does not germinate.



# Seedling:

A young plant, especially one that grows from a seed, rather than from a cutting is called seedling.

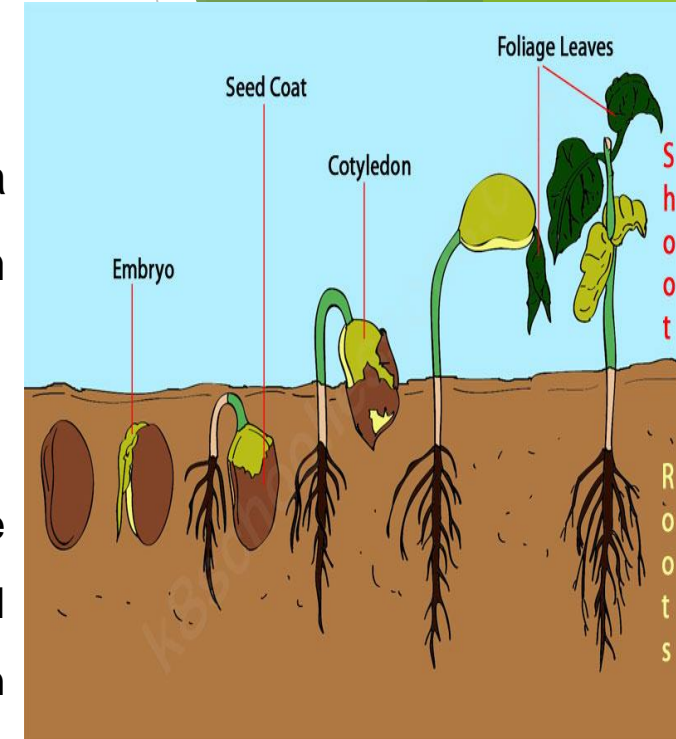
## GERMINATION

Germination refers to the process by which an organism grows from a seed or a spore. The most common forms of germination include a seed sprouting to form a seedling and the formation of a sporeling from a spore.

### Steps of germination:

**1.Environmental conditions are favorable:** For germination to occur, the environmental conditions must be favorable in order to support the growing plant. The soil depth, amount of water, and temperature are all critical conditions that must be met in order for the process of germination to be initiated. Typically, the soil conditions must be moist and warm.

**2.Water imbibition:** When environmental conditions are optimal, germination is initiated by a process termed water imbibition. The seed absorbs water through a structure called a micropyle, which induces swelling of the seed until it splits open.



**3.Root and Shoot formation:** Once the seed has ruptured, the radicle (primary root) and plumule (shoot) can emerge from the seed. This process is initiated by specific enzymes that become activated when the seed is exposed to water. The roots grow downwards, and the shoot grows upwards towards the soil surface.

**4.A seedling is formed:** Once the shoot emerges from the soil surface, the cotyledons become fully unfolded and expand, eventually forming the first leaves. Once this occurs, the plant is ready to initiate photosynthesis and is considered a seedling

# Factors affecting seed germination

1. Soil: Soil type, texture, structure and microorganisms greatly influence the seed germination.
2. Moisture: When the seeds do not get required moisture in the soil, the viability is lost. When the moisture is excess after germination, it will lead to rotting of the sprouts.
3. Temperature: When it is above and below the optimum temperature, the germination rate will be affected.
4. Light: The most effective wavelength for promoting germination is red (662 nm) and 730 nm inhibits germination.
5. Seed fertility
6. Methods of seeds sowing



## **What is Transplanting?**

Transplanting means growing seedlings in some specialized environment or container and then transfer them to their final place. It is different from direct seeding methods where seeds are directly sown in their final place.

## **Why Transplanting Seedlings?**

- If we are starting plants directly from seeds, transplanting can offer us a lot of flexibility in planning and growing crops.
- Initial few days are very crucial for any plant. In transplanting we can control its environment to the fullest. We can adjust its optimum temperature, humidity water requirements etc. That is very difficult if we plant the seeds directly to the ground soil.
- We can provide the best nutrition possible to the seedlings. A good quality potting mix can make sure us get the best possible survival rates in the initial days.
- It is easy to protect our plants from the harsh environment outside. Not only we can protect the plants from wind, heat, and rain, we can also give protection against birds, snails, and other pests.

- We can extend the growing seasons for the plants when we grow seedlings indoors. By controlling soil temperature we can grow many plants that are otherwise impossible to grow.
- A transplant has a better chance of competing against the weeds than directly sown plants.
- Lesser wastage of water. So much more environment-friendly.
- Growing seedlings indoor results in better germination rates. So we can save your cost of seeds. It would be beneficial in the longer run, particularly if we have some exotic variety.

### **Hardening Off Transplants:**

- Before we transplant our seedling to the garden we have to do what we call hardening off seedlings.
- Here the plant makes some much-needed adjustments to suit the harsh outside environment.
- When they are exposed to increased airflow or a fluctuation in temperature the plant cells make the necessary adjustment to cope up with the situation. It may be in the form of a thick stem or a stronger root system. This process is called **the hardening of the transplants**.

## **Steps in Transplanting Seedlings:**

In case we have chosen to transplant and not to start from seeds, the following steps will help us.

1. First, make a hole in the ground where we want to transplant the plant. It should be as deep as the height of the container and double of its diameter.

2. Before transplanting it is almost mandatory to give water to the plants. If we don't do that it will not be possible for the plant to get water from the soil initially. It takes some time for the plants to grow roots in its new environment.

3. Keep a hold on the stem of the plant and put the pot upside down. Due to the gravitation force, it will be far easier to take the plant out of the container.

4. Plant the seedling the same depth as it was in the container.

5. Cover it with the garden soil and press gently to ensure the roots are in solid contact with the soil. Make sure the soil remains moist constantly till we see the plant grow.

**We should try to transplant on an overcast weather condition. It will give the plant a better chance to adjust to its new home without being withered by direct sunlight.**