

# Mechanization and challenges in sowing of Kharif crops

1. **Er. Aditya raj**

Department of farm machinery and power engineering, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan -313001

2. **Er. Narendra Kumar Yadav**

Department of farm machinery and power engineering, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan -313001  
Email: narendrakumaryadav27@gmail.com

3. **Dr. Sanwal Singh Meena**

Department of farm machinery and power engineering, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan -313001

4. **Er. Megha Kumari**

Department of farm machinery and power engineering, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan -313001

*Received: May, 2024; Accepted: June, 2024; Published: July, 2024*

Kharif crops are crops grown with the coming of monsoon in different parts of the country. The Kharif season varies according to the crop and region, starting in May at the earliest and ending in January at the latest. Kharif crops are usually sown at the beginning of the first rains during the arrival of the south-west monsoon season, and they are threshed towards the end of the monsoon (October–November). These crops depend on the amount of rainwater as

## Sowing method

### Broadcasting method

Broadcasting method is the scattering or spreading of seeds on soil which may or may not be incorporated into the soil. Seed spreading can be done by hand, mechanical spreader or aero plane. This method is suitable for closely sown crops, which do not require specific spacing for optimal expression of their growth and development. For mixed cropping, the common practice of sowing seeds is broadcasting. Although it is an easy, quick and cheap method of sowing, there are difficulties in uniform distribution, keeping the soil at optimum and uniform depth and providing cover and compaction of the soil. Germination

well as its timing. Kharif crops require hot weather with abundant amounts of water. Most of it comes under rain-fed irrigation system. Pests and diseases are also more prevalent in Kharif crops than in Rabi crops. It requires short day length for flowering. The main Kharif crops grown in India includes paddy, maize, sorghum, millet, cotton, sugarcane, groundnut, pulses etc.

through this method is uneven, and its control is difficult either ways i.e., manually or mechanically. This method requires more quantity of seeds. Spreading of seeds is done in dry, semi-dry and wet fields. In this method, 100 kg seeds are required in one hectare.

### Disadvantages of Broadcasting method

- Some seeds are not covered with soil.
- The density and depth of seeds is uneven.
- Seed germination is uneven.
- Crop stand is affected by uneven distribution.
- Birds attack on seeds is very high.



### Dibbling Method

It is a method of inserting a seed into a hole or pit made at a predetermined distance and depth with a dibbler or planter. This method is suitable for crops planted in wide space that require a proper spacing for their canopy growth or cultural practices such as weeding, tilling, etc. Seeds can be sown in flat fields or on ridges. For this method there is no need to prepare the entire field for seed bed. This

method is suitable for sowing of maize, cotton, castor, groundnut, pigeon pea, onion, ginger, etc. Dibbling is more laborious, time consuming and expensive than the earlier method, but it requires less seed and gives faster and healthier germination. In dibbling, seeds are placed 2/3 from the top or 1/3 at the bottom of the ridge.



### Transplanting method

Transplanting is a common planting technique used to move seedlings from one location to another, typically from a seed tray to a larger pot or directly into the ground. The growth of seedlings is very slow in the initial stage, due to the delicacy of the plants and extra care is required to establish them in the field. Small, seeded crops like tobacco, chili, tomato should be sown at shallow depth and irrigated frequently for proper germination. Taking care

of germinated seeds/plants spread over a large area is a problem related to watering, weed control, pest control etc. Therefore, the seeds are sown in a small area called nursery. When they grow to a certain stage, they are taken out of the nursery and transplanted to the main farm.

Here's a general method for transplanting: Prepare the Seedlings- Ensure that the seedlings are healthy and sturdy before transplanting.

Water them thoroughly a few hours before transplanting to make the soil easier to work with. Prepare the Destination- If transplanting into the ground, prepare the soil by loosening it with a garden fork or shovel. If transplanting into a pot, make sure the pot has drainage holes and fill it with potting soil. Dig Holes- Dig holes in the destination soil or potting soil that are large enough to accommodate the root ball of each seedling. Space the holes according to the recommended spacing for the particular plant species. Remove Seedlings- Gently remove the seedlings from their original container, being careful not to damage the roots. A small trowel or spoon can be used to lift the seedlings out of the tray, if they get stuck. Plant Seedlings- Place each seedling into its prepared hole, making sure that the top of the root ball is level with the surrounding soil. Fill

in any gaps with soil and gently firm the soil around the base of the seedling to provide support. Water Thoroughly- After transplanting, water the seedlings thoroughly to help them settle into their new environment and to prevent transplant shock. Keep the soil consistently moist in the days following transplantation. Monitor and Care- Keep an eye on the transplanted seedlings over the next few weeks, ensuring they receive adequate water and sunlight. Protect them from extreme weather conditions if necessary, and provide any additional care specific to the plant species. Remember to handle seedlings gently during transplanting to minimize stress and damage. Additionally, timing is crucial – transplant seedlings when they are still young and actively growing to improve their chances of successful establishment.



### Drilling/Line

Drilling is the practice of sowing, dropping seeds into furrows. Furrows are made at predetermined distances; seeds are dropped at a certain depth and distance followed by covering them with soil. Sowing equipment like ‘seed drill’ or ‘seed cum fertilizer drill’ are used. The use of seeding funnels and sowing behind the plow is also practiced. Other works like application of manure and fertilizers, pesticides and soil amendments are also done during sowing. Drilling requires more time, energy and cost, but it maintains a uniform plant population per unit area. Row to row distance is also maintained in this method. Drilling enables sowing of crops like wheat barley, upland rice, jowar, pulses, safflower, sesame, etc.

### Disadvantages of drilling method

1. Drilling requires equipment like seed-drill which increases the cost of farming.
2. Drilling requires more time, energy and cost.
3. Skilled labor is required.
4. Drilling takes more time than the broadcasting method.
5. Drilling is difficult in clay and rocky soil.

### Limitations of traditional sowing methods

In manual seeding it is not possible to achieve uniformity in distribution of seeds. A farmer may sow at the desired seed rate but the intra and inter-row distribution of seeds is likely to be uneven resulting in clumps and gaps in the field. Poor control over seeding depth which requires high seed rate and thinning to bring



plant populations to desired levels. Labor requirement is high as at least two persons are required to drop seeds and fertilizer. During

Kharif sowing, planting of seeds at uneven depth may damage their emergence leads to poor plant health.

### Sowing method used for different crops

#### 1. Peanuts

Groundnut is mostly sown with seed drill under rainfed conditions. For seed drill, the number of tines is 3 to 6 and the distance between them vary from 150 to 200 mm.



#### 2. Soybean

The most common time for sowing of soybean in Kharif season is with the onset of monsoon or from the last week of June to the first week of July. Line sowing is followed by seed drill as it requires less seeds/hectare. Row-row spacing of 250 mm is considered. Soybean requires a temperature of about 15 to 32 degrees for germination, but the crop requires higher temperatures for rapid growth. Pruning of crop at about 600-650 cm height at flowering or just before flowering.

Pulses crop are mainly green gram, red gram, bengal gram, peas. Digging and drilling method is mainly used for sowing. The seeds are sown at a depth of 50 to 70 mm. green gram is sown at a distance of 100-300 mm, red gram at a distance of 300-450 mm, and bengal gram at a distance of 100-300 mm.

#### 3. Pulses

#### 4. Jowar

Jowar is sown from mid-June to mid-July. For early green fodder, jowar is sown from mid-March. Sorghum is sown either by broadcasting method or in seeding behind the plough. Seeds should not be sown more than 20-30 mm deep.

### Benefits of sensor-based technology used in sowing method

Seed is an important input in agriculture, so it is essential to minimize seed sowing and maintain proper germination conditions of the seed. Proper placement of seeds, seed rate and good growth and uniformity of seeds are desired for high productivity of the crop. In India, the main sowing machinery are seed drill, seed cum fertilizer drill and planter. The main sowing machinery components are seed box, metering mechanism, seed tube, furrow opener and ground wheel. The problem associated with sowing machinery is that there is no fixed

sowing depth, changes in seed rate while working and blockage in the seed and fertilizer tubes. All the above problems are major issues resulting in low productivity of any crop. Hence there is a need to solve these problems efficiently and economically. Sensor-based technology solves these problems, as it can easily provide data of sowing depth, seed rate and seed and detect feedback blockage. Now-a-days it is a most widely used technique for planting.