



## Agronomic Principles of Quality Seed Production

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In crop production, seed is the vital input and its importance have been recognised from time immemorial. Production of quality seeds is of foremost importance for good agricultural production as good quality seeds of improved varieties can boost up the yield up to 20-25%. Scientifically, seed can be defined as fertilized matured ovule covered with seed coat. But in broad sense it is defined as a propagating material which is used for planting or regeneration purpose or for sowing. Using quality seed gives higher return per unit area due to complete exploitation of genetic potentiality of crop, less land infestation with weeds or other crop seeds, insect and diseases, ensures fast and uniform germination and higher adaptability to extreme and variable environmental conditions. Looking forward to immense importance of seeds in crop production, its need of hour to lay emphasis on production of quality seeds.

**Quality seeds production requires certain basic agronomic principles which consists of:**

- 1. Selection of suitable agroclimatic regions for seed production:** Seed production should be carried out in areas with suitable temperature and photoperiod conditions. Carrying out seed production in undesirable environmental conditions may deteriorate seed quality.
- 2. Seed plot selection:** Selected seed production plot must fulfil the following conditions, i.e. soil fertility and texture of the plot must be in requirement of concerned seed crop to be produced, weed plants or volunteer plants must not be present in the seed production plot, soil of the seed plot must be free from soil born diseases, seed production of the same crop have not been taken in the same plot in previous season, proper drainage facility and isolation distance must be present and the land must be properly levelled.
- 3. Isolation of seed plot:** The crop raised for seed production should be separated from other fields of the same or other crop species by a minimum distance, which is different for various crops and is known as isolation distance. Isolation distance can be maintained in three ways: **A. Distance isolation:** Minimum distance required to keep the seed production plot away from contaminant plot to prevent cross contamination is called as isolation distance. It prevents natural outcrossing between the cross compatible crops, disease infection and mechanical contamination during sowing and harvesting. **B. Barrier isolation:** Use of physical barriers by planting tall or dense plants around the seed production plot border to avoid contamination by pollens transferred through wind or insects is called as barrier isolation. **C. Time isolation:** It is commonly practiced in maize crop hybrid seed production. Difference in flowering period between the crops prevents the contamination. This is followed in Maize hybrid seed production plot with a minimum of 45 days gap in flowering.
- 4. Preparation of the land:** The land selected for seed production must be properly prepared to enhance proper germination thereby maintaining adequate plant population,

- preventing soil borne diseases and pest infestation, efficient water management and drainage.
5. **Selection of the variety:** Selected variety should be high yielding, resistant to pests and disease and should be adapted to the selected agro climatic region and having good grain and seed quality. Further, the seed purchased should belong to the approved class and source of the same variety, should be known for purity, present with intact tags and seals and must be not expired.
  6. **Seed treatment:** FIR (fungicide, insecticide and rhizobium) principle should be followed for seed treatment. Seeds must be treated with appropriate chemicals with required quantity of chemicals. Use of over doze must be avoided. Use of bacterial cultures for legumes is recommended to enhance better nodulation. In order to break dormancy some pre treatments can be done.
  7. **Time of planting:** Planting of seed material should be done at right time and in right season to avoid influence of prevailing insect and disease in the region.
  8. **Seed rate:** For seed production, lower seed rates are used as the spacing is kept wider to carry out necessary field operations.
  9. **Method of sowing:** Seeds are sown at optimum depth using dibbling or seed driller. The instrument used for sowing must be clean and free from other/ same crop seeds, diseases, infections etc. Mixing of the seeds of male and female parents must be avoided and separate rows of male and female parents must be sown with utmost care and proper male: female ratio must be maintained.
  10. **Depth of sowing:** It depends on type of soil and size of seeds. Seeds with small sizes are sown at shallow depths while seeds with bigger sizes are sown at greater depth.
  11. **Roughing:** It is one of the most important component to maintain the genetic and physical purity of crop for which seed multiplication is being taken. It is removal of off types, crop plants of same species or different varieties, weeds, volunteer plants etc from the seed production plots. Generally roughing is done before flowering, during flowering and before harvesting. Number of roughing varies from two to three in self pollinated crops to four in cross pollinated crops.
  12. **Weed control:** To prevent weed growth and contamination, weed control should be done either by using suitable herbicides or following crop rotation. Weed control should be done before flowering and seed setting.
  13. **Disease and pest control:** Timely sowing of seeds, adopting seed treatment practices before sowing, timely spraying of insecticides and fungicides and roughing out infected plants timely is must to raise healthy crop.
  14. **Fertilizer management:** Fertilizers and nutrients should be provided as per recommendations. Nutrient stress must be avoided during reproductive growth stage.
  15. **Irrigation:** It must be provided at certain critical stages of crops, out of which most common are germination, flowering and seed setting. Moisture stress at certain critical stages may result in complete failure of seed setting.
  16. **Harvesting:** When crop obtains physiological maturity, harvesting is done. Premature harvesting or harvesting at overripe condition may result in incidence of insect, pest and diseases and damage due to shattering and quality losses.
  17. **Drying of Seeds:** Moisture content in cereals, pulses and oilseeds must be between 10-12%, 8-10% and 6-8% respectively. Sun drying is the most common method of drying.
  18. **Storage of the product:** Storage should be done at clean, dry and cool place which is free from contaminants and bird damage. Seeds are kept in bags or containers which should be treated from insecticides or fungicides to decontaminate them. Each bag should be marked with information like seed lot number, date of harvesting, etc. for cereals, staking height must not be more than 3-4 m and 2.5 m for other crops.