Chapter No. 1 - Seed Technology

Introduction to Seed Technology

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Definition of seed: Botanically a seed is defined as a ripened ovule or a fertilized matured ovule containing embryo which has developed after fertilization

OR

Seed is a fertilized ovule consisting of an embryonic plant together with a store of food all surrounded by a protective coat.

OR

Seed is plant part which is used for propagation or multiplication to next generation.

e.g. True seed, tubers, Suckers, Bulbs, Cuttings, grafts etc.
Introduction:
The Seed Certification Standards are applicable to all crops which are eligible for certification. The field & seed standards for the individual crops, shall bear the Minimum Seed Certification Standards.

I. Purpose of Seed Certification
The purpose of seed certification is to maintain and make available high quality genetically and physically pure seeds & propagating materials of notified varieties to the agencies/public. Seed certification is designed to achieve prescribed standards.

II. Certification Agency
Certification shall be conducted by the Certification Agency notified under section 14(2) of the Seeds Act, 1968.
III. Certified Seed Producer
Certified seed producer means a person/organization who grows or distributes certified seed in accordance with the procedures and standards of the certification.

IV. Eligibility Requirements for Certification of Crop Varieties
Seed of only those varieties which are notified under Seeds Act, 1968 shall be eligible for certification.

V. Classes and Sources of Seed
Stages of seed multiplication:

For maintenance of genetic and physical purity during seed production, adoption of generation system is followed, starting from nucleus seed which is multiplied in further stages as breeder, foundation and certified seed.

1. Nucleus seed
2. Breeder seed
3. Foundation seed
4. Certified seed
5. Truthful seed

Different types of seeds:

1. Nucleus seed:
   - A group of progenies of selected individual plants taken from a variety for the purpose of purifying and maintaining that variety free of mixture and off types
- It is a **handful** of basic seed maintained by concerned breeder for further multiplication
- It can be taken in two stages i.e. **stage I** and **II** by the originating breeder.
- In cereals, the stage I is from head to rows and stage II is from row to bulk.
- **Rigorous selections** and rejections of a whole row or bulk should be practiced to maintain purity.
- Thus, nucleus seed is the **initial seed** of an improved variety which is limited in quantity and produced by **originating plant breeder** of the institution/ state Agricultural Universities
- Nucleus seeds **has** the **highest physical** and **genetic purity**

**2. Breeder’s Seed:**
- A progeny of nucleus seed produced under the supervision of original or sponsored plant breeder.
➢ It is directly controlled by originating breeder under his supervision.

➢ The breeder seed certification is jointly carried out by state agricultural seed certification agency, representatives of seed multiplication agencies & plant breeders.

➢ It should bear satisfactory **genetic purity, identity** and other standard parameters.

➢ The thorough **rouging** is required to remove off types.

➢ It is the source for the production of seed of the foundation class.

➢ The breeder seed needs genetic purity to exact 95 to 98% for different crops and to maintain the other norms as fixed by the government.

➢ The germination test is carried in government or govt. approved seed testing laboratories.

➢ It is **labeled** with **golden yellow** colored tag

➢ The other quality factors of Breeder seed such as germination %, physical purity, inert matter, germination etc. shall be indicated on the label on actual basis.
3. Foundation Seed:

➢ The progeny of breeder’s seed grown under the supervision of certifying agency to meet the requirement of genetic and physical purity as per the standards.
➢ The production must be acceptable to a certifying agency. It can be taken in two stages, I and II
➢ This class of seed is multiplied usually under the supervision of Government seed farms, farms of the Agricultural Universities, at the farms of the National seed Corporation or a cultivators field under strict supervision of research scientist of the different universities and seed certification agency (SCA)
➢ Foundation seed is purchased by Seed Corporation from seed growers.
➢ Foundation seed can again be multiplied by Seed Corporation if there is shortage with similar seed certification standard.
➢ Foundation seed is the source for production of certified seed.
➢ The genetic purity needs to be at the extent of 95 to 98% for different crops
➢ The white colored certification tags or labels are attached to the foundation seed.
4. Certified seed:

- It is a progeny of foundation, produced by progressive farmers according to standard seed production practices. It is certified by State Seed Certification Agency (SSCA) OR seed certified by any Certification Agency established in any foreign country under legislation.

- The main objective of seed certification is to maintain seed and to make available high quality seeds and propagating materials of notified varieties to the farmers.

- To achieve this, the qualified and trained personnel from seed certification agency (SCA) carry out field inspections at appropriate stages of crop growth, so as to ensure the genetic identity and purity.

- The SCA also make seed inspection by drawing samples from seed lots after processing to maintain quality and purity.
The SCA verifies for both field and seed standards and the seed lots must be confirmed to get approval as certified seed.

Thus, the certified seed is meant for general crop production which is generally produced from foundation seed

It needs the genetic purity to the extent of 95 to 98% for different crops

The blue color certification tag/label is attached with certified seed with all details.

5. Truthful Seed:

It is a type of seed which is not certified but the labeling is done to indicate its quality or standard.

The color of label is opal green.

The farmers/companies can produce and supply this seed
Following flow chart shows the seed multiplication chain

**Fig**: Seed multiplication chain
Role of Seed Technology

➢ A carrier of new technologies:
The introduction of quality seeds of new varieties increase yield levels. In India, the cultivation of high yielding varieties have helped to increase food production nearly up to 291.95 million tonnes which is higher by 6.74 million tonnes than the production of food grain of 285.21 million tonnes achieved during 2018-19. Thus, seed acts as a vehicle for the superior genotypes to reach farmers.

➢ A basic tool for secured food supply:
The successful implementation of the high yielding varieties seed production programme in India. This has led to a remarkable increase in production and reduction in the food imports from other countries, in spite of rapid increase in population. Introduction of semidwarf and high yielding varieties of rice and wheat and hybrids of different crops increased the productivity and led to potential development.
The principal means to secure crop yields in favorable area of production
The supply of good quality seeds of improved varieties suitable to these areas is one of the important contribution to secure higher crop yield.

A medium for rapid rehabilitation of agriculture in case of natural disaster
In case of floods and drought affected areas the Government will provide the improved seeds from national seed stocks to rehabilitate the agricultural production of food grains in the country. National Seed Reserve Stocks gives high priority for meeting such natural calamities. This would provide improved seeds in emergency periods to production areas for rapid production of food grains.
Thank you...