



**FACULTY OF AGRICULTURAL SCIENCES
AND ALLIED INDUSTRIES**

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SST 221, PRINCIPLES OF SEED TECHNOLOGY**

UNIT 1- PRINCIPLES OF SEED TECHNOLOGIES(SST-211)



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Importance of Seed Production

Introduction

The primary objective of plant breeding is to develop superior varieties. The benefits from superior varieties can only be realized when they are grown commercially on a large scale. Therefore seeds of improved varieties must be multiplied at a large scale to make them available to farmers for commercial cultivation. During the multiplication of varieties for use as seed, it is essential that genetic purity of the variety must be maintained. For best results the farmer should use new pure seed every few years in case of self-pollinated crops and every year for hybrid varieties or every few years for synthetic and composite varieties in the case of cross pollinated crops. This would require the maintenance of seeds of superior varieties in genetically pure state, which would be multiplied every year to supply new seed to the farmers. It is clear that the seed of new varieties should reach the farmers in a pure and healthy state. To ensure this, elaborate seed programmes exist in most of the countries. India also has a well organized seed production programme in the form of national seeds corporation (NSC), state seeds corporations (SSCS) and state seed certification agencies (SSCAS). These organizations are responsible for seed multiplication, certification and distribution of high quality seed.

Historical Background

The procedures for seed production and processing and the standards for seed certification developed slowly with the realization of the importance of quality seed in agriculture. Most likely, seed certification began in Sweden during the last quarter of nineteenth century. In 1886, the Swedish seed association was formed, it undertook the production and distribution of quality seeds of improved varieties of mainly forage crops. Towards the end of 19th century, Dr. E. Helve established a seed testing laboratory in den mark in order to conduct seed tests for

certification. In 1917, Dr. J.W. Robertson, a Canadian scientist, proposed the production of foundation seed, which is now a cervical stage in quality seed production. In 1919 the international crop improvement association (ICIA) was formed and renamed as association of seed certification agencies (AOSCA) in 1969. This association has been crucial in the development of procedures and standards for quality seed production and seed certification.

Development of seed industry in India

In India, new improved varieties of some important crops, notably wheat, were developed during the first two decades of the 20th century. Efforts were made by the state depts. of agriculture and some other agencies to disseminate the seeds of these improved varieties among the farmers.

In 1925, the royal commission on agriculture reviewed the production and distribution of seeds in India; it made several notable observations and valuable recommendations other commitments persons who reviewed and made recommendations. For the seed situation in India are as follows sir John Russell (1937), imperial council of agricultural research (1940), Dr. Barnes (1944), the famine commission (1944) and food grains policy committee (1944), Quality seeds of vegetables were being imported from countries like Australia, UK, U.S.A, Germany etc up to 1939. Several private companies were formed during 1950's onwards and involved in the production and marketing of quality seeds of various crops. Both crop improvement and quality seed production received impacts after independence. In 1952, the Indian council of agricultural research (ICAR) appointed a standing experts committee on seeds, which formulated a programme for strengthening the seed production and distribution systems.

In 1959, the agricultural production team, headed Dr. Johnson recommended that uniform standards of seed certification and seed laws should be brought into place and that each state

should establish seed testing laboratories. The planning commission appointed a seed multiplication team to review the various aspects of seed programmes; this team made several valuable recommendations. Similarly,

ICAR set up a committee in 1960 in order to suggest ways for developing a strong seed production programme; this committee suggested the establishment of central and state agencies for the production of foundation seed, the establishment of independent seed certification agency, the enactment of a national seeds act and the creation of agencies for its enforcement and for stimulating the development of private seed industry. Based on these recommendations, the national seeds corporation (NSC) was established in 1963 and the Indian seeds act was enacted in 1966. The Govt. of India set up a seeds review team in 1968; the team toured several foreign countries and made some far-reaching recommendations. One of the recommendations was that the agricultural universities should also be involved in foundation seed production. The seed industry developed fairly rapidly with the establishment of NSC. Both the quality seeds produced and the number of crops covered has expanded rapidly.

The Indian Seeds Act (1966)

The Indian seeds act was enacted in 1966 and has been in force since October 2, 1969 in all the states and minor territories. The seeds act was amended on September 9, 1972 [The seeds (amendment) act, 1972). This act aims at regulating the quality of seed sold for agricultural purposes through compulsory labeling and voluntary certification under, compulsory labeling, any one selling the seed of a notified kind or variety, in the region for which it has been notified must ensure that

1. The seed conforms to the prescribed limits of germination and purity
2. The seed container is labeled in the prescribed manner and

3. The label truly represents the quality seed in the container. Under voluntary certification any one interested in producing certified seed may do so by applying to the seed certification agency.

Statutory bodies and agencies established in India under the Seeds Act 1966.

1. Central Seeds Committee: It is the main source of advice to central government on administration of seed act and any other matter related to seeds. It consists of a chairman, 2 representatives of seed growers, 8 nominees from central govt. and one representative from state government.

The main functions are:

1. To advice central and state govt. on all matters related to seeds
 2. To advice the govt. on notification of varieties
 3. To advice the govt. on the minimum limits for germination and purity of kind/variety
 4. To recommend procedure for seed certification, GOT and analysis of seeds
 5. To recommend on rate of fees to be charged for analysis of samples by central and state Seed Testing Laboratories and for Certification by certification agency.
 6. To recommend to central govt. regarding suitability of any seed certification agency established in foreign country for seed act.
 7. To advice central and state governments regarding suitability of establishing Seed Testing Laboratories.
 8. To send recommendations on proposals related to seed act.
 9. To suggest clarification on any matters relating to seed act.
2. Central Seed Certification Board: To deal with all problems related to seed certification and to co-ordinate the work of sate seed certification agency.

3. State Seed Certification Agency – SSCA are established on the recommendations of Central Seeds committee as a society having governing body and an executive wing. The governing body consists of persons from state government, seed producing agencies, farmers, subject matter specialists and seed law enforcement agencies. The executive wing consists of seed inspectors, seed certification officers and seed analysts.

Functions:

1. To certify the seeds of any notified variety
2. Outline the procedure for submission of application and for seed production.
3. Maintain a list of recognized breeders
4. Verification of the application for certification
5. Take samples and inspect seed lots to confirm quality of seed lot as per the standards of certification.
6. To ensure production of quality seed by field inspection, seed processing plant inspection etc. to issue certificate i.e. tags, labels etc.
7. Undertake educational programmes to promote the use of certified seed.
8. Maintain records relating to certified seed production.

4. Central Seed Testing Laboratory: The Seed Testing Laboratory at IARI, New Delhi has been notified as CSTL. The functions assigned to this laboratory are:

1. Initiate seed testing program in collaboration with state seed testing laboratory to promote uniformity in test results.
2. Collect data on the quality of seeds found in the market and make this data available to Central Seeds Committee.
3. Carry out functions assigned by Central government from time to time.20

4. Act as referee laboratory in testing seeds.

5. State Seed Testing laboratory

1. To carry out seed analysis work of the state. To test the seed of dealers for physical purity, germination, inert matter, weed seeds, other crop seeds etc.
2. To test the seed samples of cultivators who wish to get their own seed tested before selling,
3. to test samples sent by seed inspectors
4. To test samples of seed for seed certification agency
5. Testing required for revalidation and other purposes.

6. Appellate Authority

1. It is appointed by the state government to look into grievances of seed producers against seed a seed certification agency and
 2. To look into the grievances of seed traders against seed law enforcement officials.
7. Recognition of SCA's of foreign countries: Central government may establish any seed certification agency established in an foreign country for the purpose of Indian Seeds Act 1966.

Notification of Standards and Procedures

The central government after consultation with Central Seeds Committee have fixed the standards for certification and standards for labeling by notification.

The certification standards cover overall aspects including genetic purity, physical purity, germination and disease infection etc. the certification standards for physical purity and germination are usually higher by 1-2 % and 5-10% respectively than labeling standards.

Notification of Variety

Notification is done by the Central sub-committee on crop standards and notification. It is based on the seed demand and popularity of a variety. Notification brings the kind/variety under the purview of seed act. Under the seed act certification is voluntary but labeling is compulsory. Regulation of sale of notified varieties: Under section 7 of the act the seed of notified variety can be sold in containers only. The seed may be truthfully labelled or certified but it should meet the minimum prescribed requirements.

Requirement for sale of seed: The seed which is sold should be compulsorily labeled. The colour of the label shall be blue for certified seed and greenish buff colour for truthfully labeled seed.

The seed container shall be labeled with following details.

1. Kind
2. variety
3. Lot No.
4. Date of test
5. Inert matter % purpose or Poison
6. Pure seed %
7. Other crop seed (No./ Kg.)
8. Weed seed (No./Kg)
9. Germination %
10. Net Contents
11. Sellers name and Address
12. If treated - Do Not Use for food or oil

When net content is 250 grams or less item no. 5 to 9 may be replaced by the following statement. "The seed in this container confirms to the minimum limits of germination and purity prescribed under the act." Seed inspectors are responsible for the seed law enforcement. The seed samples are tested under the supervision of state seed Analyst at the state seed testing laboratories.

Enforcement of the Seed Act : - Under the seed law enforcement programme the seed offered for sale are subjected to be sample by seed inspector appointed by state govt. under the provisions of the Act. The seed thus sampled by the seed inspector is tested for physical purity & germination % in a state STL. Under the supervision of seed Analyst. Seed production is done by the registered grown for a Company or corporation of the buyer feels that the seed is not to the required quality he may contact the seed inspector for fallow up action.

Sampling : - Samples drawn by the inspector are sub-divided into 3 parts & are sealed in the presents of seller. One sealed cover will be sent to the lab, the 2nd one will be retained by the seller & the third one with inspector. The cost of seed taken through sampling may be paid to the seeds man on demand. The label on any sample should bear.

1. S. No.
2. Name of the sender with official designation
3. Name of the person form when the sample has been taken
4. Date & Place of taking the sample²²
5. Kind & variety of the seed for analysis
6. Nature & Qty. of preservative added if any

Powers of seed inspectors : - Sector IX Rule 23 specifics duties of seed inspector which may be summarized as follows.

1. He can draw representative samples of any kind / variety from any person selling such seed & send them analysis to the seed analyst.
2. To enter & search any place in which he believes that an offered under thus Act has been committed. He can order not to despise of any stock of such seed for specific period not exceeding 30 days.
3. To examine any record, register or document & seize them, if he feels that they can furnish evidence of an offered punishable under the Act.

4. On demand to pay the cost of seed calculated at the rate at which such seed is sold to the public.
5. He can break open the door & premises of seed seller if the seller refuses to open the door.
6. Search seizes the stocks & records etc.
7. He can investigate any complaint made to him in writing.
8. He can institute prosecutions in respect of breach of rules & regulations
9. Prohibit the sales of such seed which he feels are below the minimum limits of germination or improperly labeled & can initiate action against the sellers.

Offences of Seed Act: - If the seed lot is found to be substandard legal action can be initiated against the seller or if the labels are absent he may be requested to label the seeds properly

1. Legal proceedings can be initiated in a court of law for selling sub-standard seed & on conviction a fine upto Rs. 500/- can be imposed to the default.
2. If a same crime is committed for second time – In second convictions the penalty may extend upto 6 months imprisonment or fine upto Rs. 1000/- or both.
3. Forfeiting of property (Section 20 seeds Act 1966) – When any person has been convicted under the Act, the seed in respect of the contraventions may be forfeited to the Govt.
4. Offences by companies – (Section 21) When an offence is committed by a Company every person, who at the time of offence was in charge & responsible to the Company shall be deemed to be guilty of the offence & are liable to punishment.

New Seed Policy

A national seeds policy (2001) has been formulated to facilitate development, production and distribution of improved varieties of seeds and planting materials, strengthening and expansion of seed certification system with increased private sector participation and liberalized setup for import and export of seed and planting material. The policy will also outline the role of

biotechnology in the development of agriculture sector, clearly defining the regulatory framework for transgenic plant varieties.

The seeds division of Department of Agriculture and Cooperation will supervise the overall implementation of the national seeds policy including PPVFR bill, seeds act, Registration of plant varieties and import and export of seeds.