

# PRINCIPLES OF SEED TECHNOLOGY (PBS 501)

BY

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## LECTURE 1

- Differences between Seed and Grain
  - \* Seeds are planting materials to produce good crops
  - \* Seeds is nature's bridge for conveying improved and superior characters between generations and to farmer's field.
  - \* Seed represents fruits of Plant Breeding
  - \* Grain is meant for food, feed or raw materials
  - \* Seed can become grain but grain cannot become seed e.t.c
- Definition of Seed Industry
- Basics Components of Seed Quality are:
  - \* Superior, high yielding variety
  - \* Genetically pure
  - \* High germination percentage
  - \* Freedom from seed-borne diseases
  - \* Freedom from other crop seed, inert matter-noxious weed seed
  - \* High seedling vigour
  - \* Safe Moisture content
  - \* Good physical appearance etc
- Functions of Seed Industry
  - \* Plant Breeding i.e different types of seed
  - \* Cultivar assessment
  - \* Multiplication
  - \* Processing
  - \* Marketing and Procurement
  - \* Quality Control
  - \* Quarantine
  - \* Extension Activity

## LECTURE 2

- Requirement for Seed Production
  - \* Climatic factors: temperature, rain (water supply), wind, light

- \* Agronomical/soil factor
- \* Biological factor
- \* Social & Economic factor

- Pollination

- \* Definition
- \* Modes of pollination:
  - Self pollination
  - cross pollination
  - Vegetative propagation
- \* Pollination of F1 hybrid seeds – mostly controlled pollination operates
- \* Methods of pollination in F1 hybrid seed production
- \* Detasselling – Male sterility and hand pollination
- \* Practical implication of cross pollinations
  - Isolation from contaminants

- Seed Multiplication chain

- \* Seed is multiplied in controlled stages to achieve good quality
- \* Breeder seed
- \* Foundation seed
- \* Certified seed

### LECTURE 3

- Improvement factors to consider in seed multiplication

- \* Previous cropping history of the land
- \* Fertilizer application
- \* Irrigation
- \* Weed and its control
- \* Disease and pests & their control
- \* Seed for sowing
- \* Sowing date and rate
- \* Mechanical contamination

- Roguing is a process of removing undesirable plants from field crops.

- \* Such contaminants are weeds, plants of other crop spp. Plants of another cultivar of some spp, off-types or genetic variants etc
- \* Efficacy depends on the distinctness of the rogues and skill of the rogues.
- \* Contribute to maintenance of purity

- \* Is an essential operation in seed multiplication
- \* Should be done several times at different stages of crop development
- Determinant of seed quality
  - \* Source of seed
  - \* Inheritance factor
  - \* Field contamination
  - \* Growing conditions
  - \* After maturation
  - \* Harvesting
  - \* Aeration
  - \* Handling
  - \* Processing
  - \* Storage
  - \* Chronological age
  - \* Uniformity

#### **LECTURE 4**

- Contract Seed Production
  - \* Contract growing what is it?
  - \* Why contract grower
  - \* Characteristics of contract growers
  - \* Organization of contract growing
  - \* Contract documents
- Seed Processing, treating & Packaging
  - \* What is seed processing?
  - \* Purpose of seed processing
  - \* Principles of seed processing
  - \* Pure live seed
  - \* Essential steps in seed processing
  - \* Types of materials removed from seed during processing
  - \* Seed cleaning equipment
- Seed treatment
  - \* Definition of seed treatment
  - \* Seed packaging – Benefits and types
  - \* Types of seed treatment materials

#### **LECTURE 5**

- Seed marketing
  - \* Definition of seed marketing
  - \* Seed marketing scheme
  - \* Reasons why seed marketing differs from marketing of other agricultural inputs
  - \* Seed marketing organization and management
- Activities in seed market operations
  - \* Market intelligence
  - \* Demand assessment
  - \* Inventory control
  - \* Seed storage
  - \* Pricing
  - \* Dealer development
  - \* Logistics and seed movement
  - \* Supply and transport
  - \* Sales and collection of sale proceeds
  - \* Promotion and publicity
  - \* Market research

#### Seed Laws

- \* What is seed legislation?
- Legislative Strategy: Two types
  - \* Truth-labeling
  - \* Minimum standards
- Provisions of State and Federal Seed Laws
  - \* Farmer seed exchange
  - \* Current Germination Tests
  - \* Labeling vegetable seed container
  - \* Transport for Processing
  - \* Disclaimer not allowed
  - \* Proof of Internet not needed
  - \* Colouration and labeling of treated seed
  - \* Keeping of records
  - \* Collection of damages etc
- Breeders' Rights
  - \* Legal protection for crop varieties
- Provides two avenues of protection of owner of a variety

- \* Rights to the propagation and use of a protected variety
- \* Rights to stipulate in his application that the variety name be protected through seed Certification
- \* Special exemption for farmers – right to produce seed of a protected variety for their use and for sale to neighbors’ for planting.
- Farmers’ Rights
  - \* Recognition of contributions of farmers to conservation and development of Plant Genetic Resources (PGR)
  - \* Right to protect traditional knowledge
  - \* Right to participate in benefit sharing and in national decision making about PGR
  - \* Right to save, use, exchange & sell farm-saved seeds.

## LECTURE 6

- Seed Programme Development (SPD)
  - \* Justification and missing of SPD
- Components of seed industry programme
  - \* Crop improvement and plant breeding
  - \* Availability of seed
  - \* Rapid rehabilitation of agriculture
  - \* Objective Economic and technical justification
- Specific Benefits of Seed Programme in a Country
  - \* Increase in total yield due to introduction and distribution of superior seeds of variety/hybrid
    - \* Increase in yield due to higher physiological quality of planting materials
    - \* More efficient utilization of fertilizers, irrigation and pesticides
    - \* Reduction in planting rate
    - \* Higher quality of produce
    - \* Less re-infestation of land with weed seeds
    - \* Less diseases in the soil and soil insect problem in seed beds and in the field
  - \* More rapid and efficient periodic replacement of varieties with newer and better ones
  - \* Facilitate introduction of new crops into agriculture

- \* Contributing to agric development of a nation
- \* Employment opportunity
- \* Contributing to nation economic (GDP) growth
- \* Quality control
- Essential elements of seed programme
  - \* Skilled knowledgeable manpower
  - \* Needs for diffusion of efforts for solid and pragmatic seed programme
  - \* Quality of input into the programme
  - \* Time frame is realistic (No crash programme)
  - \* Planning & evaluation and implementation

## **LECTURE 7**

- Sampling of Agricultural Seeds
  - \* Two steps are involved
    - Step 1: submitted sample
    - Step 2: working sample
- Sampling process
  - \* Bulk seed
  - \* Seed in Bags
  - \* Seed in small container
  - \* Sub-dividing the sample
  - \* Mailing the sample
  - \* Sub sampling

## **LECTURE 8**

- Seed germination test
  - \* Seed treatment and packaging
  - \* Seed vigour test

## **LECTURE 9**

- Practical
  - \* Seed purity determination
  - \* Seed Moisture content determination

## **LECTURE 10**

- Revision class
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