Role of Seed Sector Players in High Quality Seed Delivery

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Seed Enterprise Management Short Course for NPPOs and Seed Quality Regulators - UON
Role of Breeders

Breeding objectives

- Breeding objectives and strategies vary within and between crop(s). Why??
- Agro-ecological conditions widely varied, therefore different needs.
- Need for commercial varieties and those for public good (for food security).
- Increased yield
- Resistance/tolerance to pests and diseases
Role of Breeders

Breeding objectives...

• Tolerance to abiotic stress – drought, nutrient deficiencies and toxicities, etc

• Increased food quality – nutritional benefits – vitamins, unsaturated oils etc

• Specialty crops for non-food use – starch (potatoes), oil (sunflower), alternative energy sources (sugar cane, sweet sorghum)
Role of Breeders

Quality objectives

• Develop varieties with superior attributes – Yield, stress tolerance, quality attributes

• Package technology and deliver the same to user – farmers, industry, etc

• There are critical quality requirements to ensure technology is delivered to users intact.
Role of Breeders

Quality considerations

- Stability – Varietal performance across environments and generations
- Eliminate inferior attributes – mutants, sterility etc
- Ensure variety has a unique descriptor – helps propagate the variety intact.
Quality Control at Breeder Level

Variety Maintenance

• Is the responsibility of every breeder

• Important as it ensures variety maintains its essential characteristics for performance and identification (Certification, PBR)

• The breeder’s seed field should show minimum variation for morphological traits as compared to other seed classes
Quality Control at Breeder Level

Variety Maintenance

• Avoid pollen contamination and varietal mixtures.

• Continual elimination of outliers to maintain uniformity.

• Ensure proper agronomic practices e.g elimination of weeds – seeds may be easily carried in breeders’ seed.
Quality Control at Breeder Level

Variety Maintenance

• Ensure crop health is maintained. Two pronged:
  – Ensure Breeders’ seed is healthy
  – Eliminate seed borne, especially latent viral infections, which are not easy to detect
Quality Control at Breeder Level

- Ear-Row, Pod-Row, Head-Row etc
- Small plots
- Bulk plots
- For inbred lines, single ears are examined
- In Kenya, breeder’s seed is produced with involvement of certification agency (KEPHIS)
Quality Control at Breeder Level

The Breeder should establish a water-tight system to ensure that a handful of seeds are multiplied to produce tonnes of seeds while maintaining the varietal attributes.
Role of Seed Companies

Seed is the basic input that sets the potential for crop yield.

Objectives of Quality Control

1. Ensures that seed received by farmers is of high quality so as to maximize their crop production.

2. Minimize losses through rejections to ensure favourable prices and good business.
Quality Control at Merchant Level

A seed company:

- takes full responsibility with regards to the quality of the seed

“Quality control is a measure without an upper limit”
Quality Control at Merchant Level

To ensure high standards of seed quality, a seed company should:

• have adequate trained and competent personnel knowledgeable in seed related matters and conversant with the seed industry;

• Have adequate land for seed production:
  – Free from soil-borne diseases
  – Enough space to ensure pollen control and avoid varietal mixtures
  – Accessible to operators and regulators
Quality Control at Merchant Level

To ensure high standards of seed quality, a seed company should:

• Appoint seed growers with a thorough understanding of agronomic and field quality standards.

• Growers should have adequate capacity – manpower, machinery, storage facilities etc.

• Growers should deliver all seed, including rejects to the seed merchant.
Quality Control at Merchant Level

To ensure high standards of seed quality, a seed company should:

• Have proper storage and seed handling facilities
• Ensure safe conveyance of the seed
• Have an established distribution system:
  – Agents
  – Sub-agents
  – Stockists
Quality Control at Merchant Level

To ensure high standards of seed quality, a seed company should:

• Have a proper outreach system for marketing and training.

• Have capacity to estimate the market demand of seed to avoid over/under production.

*Quality awareness creation among all seed handlers and farmers is very critical.*
Quality Control at Merchant Level

- Keep records of each seed lot, produced tested and certified, purchased, sold etc to ensure traceability of the seed;
- Ensure official re-sampling and testing of seed lots whose validity of certification has expired;

"An internal system for regularly checking the quality of seed is highly recommended"
Role of Regulators in Seed Quality Assurance

• Regulators offer seed quality assurance by ensuring the minimum standards are kept.
• Uses clearly defined standards, which takes into consideration the needs of the producer and the consumer.

“Quality assurance is about minimum standards while Quality control is about maximum standards”
Seed Quality Assurance

• In Kenya, Seed certification as stipulated in Cap.326 of the laws of Kenya ensures that only high quality seed crop varieties are available for use by the farmers.

• Official seed certification begins with known parentage and the multiplication/crossing patterns are technically defined.
Seed Quality Assurance

Quality assurance is done for all seed classes:-

1. **Breeders** - The original nucleus seed from the breeder.

2. **Pre-basic** - The harvest from the breeders seed.

3. **Basic** - The harvest from pre-basic.

Seed Quality Assurance

5. **Standard seed** - The last status/class that is used during emergencies only. NB:

6. **For all hybrid seeds**, certification schemes end at C.I.G. But for self pollinated plants, only up to C.IV.G is classified.

- **Breeders, pre-basic and basic seeds** are labeled with KEPHIS white label while C.I.G is labeled with blue, C.II.G-C.IV.-pink and Standard -Grey.
Seed Quality Assurance

- The process of **Quality Assurance** involves the following processes

1. Field inspection
2. Seed Processing
3. Seed testing
4. Labeling and sealing
5. Post control
6. Post Certification survey
7. Import/Export of seeds
Seed Quality Assurance

1. **Field inspection** – This is the first step

   Before it commences, the merchant must
   1. Register fields for inspection
   2. Provide proof of origin of the parents
   3. Observe the minimum isolation distance

   **Inspection is carried out to ensure that**
   - The crop is true to type
   - It has no genetic or physical contamination
   - The crop is healthy (free from disease/pests)
2. **Seed Processing**

Seed crops are harvested and processed to remove weeds, inert matter, immature seeds, broken & diseased seeds. They are graded and treated with protective chemicals.

3. **Seed Testing**

Lab tests are useful in determining purity, germination capacity, moisture content and health status of seed lots.
Seed Quality Assurance

4. **Labeling and sealing**
   - Every seed lot is then labeled with a label and a seal
   - This ensures that the seed cannot be tampered with without damaging the seal, label or container beyond repair.

5. **Post Control**
   - These tests are meant to ascertain that the preceding control measure have been effective. They ensure that varietal characters remain unchanged during multiplication.
6. **Post Control**

- This is a growing test the checks the varietal purity and health of seed already distributed to farmers.
- Samples are taken during processing and at points of sale are planted alongside the post control plots for comparison.
- Complaints of low quality seed are easily verified.
- It checks the effectiveness of the quality control regime and results are used for improvement of the system.
Seed Quality Assurance

Import/Export of Seeds

The regulator specifies import/export requirements and ensures that they are kept

1. Checks the relevant documentation
2. Inspects consignments
3. Undertakes sampling and testing of imported seeds
4. Only a registered seed merchant can import/export seed.
Seed Quality Assurance

Other roles of the regulator:-

- Vetting and registration of seed dealers – Merchants, distributors, stockists.
- Maintenance of list of varieties eligible for certification
- Maintenance of a plant breeders’ rights register
THANK YOU