CERTIFIED SEED QUALITY ASSURANCE PROCEDURES

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Seed System In Kenya

INTRODUCTION

• Wheat seed operations involve many institutions—often uncoordinated and lack expertise in local and national seed and crop systems.

• Hence does not adequately address the real constraints affecting access to quality seed by the resource-poor farmers

• This results in increased use of farmer saved seeds of the adapted varieties than certified seed

• This seed is produced and maintained at farm level by the small holder farmers/farmer groups with little/no quality assurance measures

• Seed regulatory frameworks have deficiencies in seed laws and plant breeding protocols in developing countries

• A new crop variety faces tow challenges

  ✓ stocking up on seed

  ✓ its distribution to meet expected demand (IAEA, 2008)
Seed system in Kenya...

Wheat seed production potential

• Wheat seed production potential has not been fully realized
• Researcher/farmer participatory variety evaluation enhances desirable cultivar identification, development and adoption by the farmers/processors
• Participatory on-farm selection & evaluation of elite cultivars with farmers has not been adequately embraced and popularized
• This leads to low seed multiplication scale, short life span of improved varieties in production before the yield potential declines
• When a variety takes too long to multiply and disseminate, it may loss its usefulness by the time it reaches the farmers/market.
• Other suggested ways for seed production and multiplication are:
  ➢ Informal secondary seed production
  ➢ Use of irrigation
  ➢ Participation of private sector.
Seed system in Kenya...

Informal seed production on farmers’ fields could help to:-

- meet farmers’ seed demand
- facilitate dissemination, diffusion and adoption of the new crop varieties
- Lack of infrastructure for seed merchants may lead to static production and sales because:-
  - Farmers keep large quantities of grain for seed in addition to lack of credit accessibility.
  - If basic seed will come solely from specific source/body, the merchant cannot program his production so he must maintain his varieties
- Land fragmentation
- High cost and lack of adequate seed processing machines/spare parts for the small holder
- Price control by the government
Seed system in Kenya...

- **Variety Replacement**
  - Over time released commercial varieties may lose their resistance to diseases, insect pests and production potential.
  - This limits the number of generations that a variety should remain in production before a new one is released.
  - The global average age of variety replacement is seven years.
  - Slow varietal turnover reflects a poorly developed seed industry and weak extension services.
  - This encourages farmer to farmer seed exchange in wheat growing areas.
Variety replacement...

- Old varieties need replacement with new pests/disease resistant and high yielding wheat varieties.
- Seed/variety replacement is variable according to the variety grown.

- Some varieties take longer to replace because of their qualities that farmers/processors cherish

  **Example** [Test weight: Kwale=80.2 kg/HL, Eagle 10=79.5 kg/HL and K Korongo=78.7 kg/HL]

- Problems faced by farmers in replacing their seed frequently include:
  - High cost of certified seed
  - Unavailability of certified seed
  - Limited/credit unavailability
  - Lack of information – awareness of the existence of the new improved varieties.
Variety replacement...

• Awareness can be improved by:-
  ➢ **Interaction between researchers, farmers/processors/millers etc**
  ➢ broadcasting over the radios,
  ➢ pamphlets,
  ➢ demonstrations and field days,
  ➢ roadside advertisements etc.

• Increased awareness increases demand for the new variety
• However the demand for the new varieties at the farm level will be determined by:-
  ➢ the cost of the seed and
  ➢ financial capacity of the farmers to afford the seed.

• Knowledge of farmer’s/processors contribute strongly to the length of time farmers can maintain appropriate seed quality.
Certified Seed Production

• The source of seed is from nucleus breeder/foundation seed
• or any source approved by the certification agency - KEPHIS
• Seed from breeders stage 3
• Pre basic
• Basic
• C1, C2, C3
• Wheat seed is mainly grown in rotation with any other crop eg maize, potatoes, oil crops (canola, sunflower) legumes etc
Certified seed production...

Land requirements

• Land requirements for certified seed
  ➢ production Virgin/under grass
  ➢ Had no wheat crop for two seasons
  ➢ Must be verified
  ➢ Beans
  ➢ Vegetables
  ➢ Potatoes
  ➢ Oil crops
Certified seed production...

Good agricultural practices

Good seed bed preparation & early planting

• Appropriate fertilizer application rates

• Appropriate seed rates recommended for the variety in question

• Good planting methods/efficient machinery well calibrated

• Control of insect pests, diseases and weeds - spraying right chemicals, timing and rates (friendly to the environment)
Certified seed production…

- Manage noxious weeds
- Noxious weeds must be eradicated/controlled in a seed wheat field

Datura (*Datura stramonium*)

Darnel Ryegrass (*Lolium temulentum*)

Wild oats (*Avena sativa*)
Certified seed production...

• Rogueing of off types in the field

• Two to three rogueing may be necessary

➢ Just ahead of the flowering stage

➢ Just after flowering is completed and before the crop starts to turn colour

➢ After the ears/heads turn colour and start to mature
Certified seed production...

- **Field inspection**
  - At ear emergence and seed has started to fill
  - Glume and seed color can be seen

Joint field inspection by KEPHIS and KALRO staff
Certified seed production...

- **Harvesting**
- Supervised harvesting by KEPHIS and KALRO staff
- Harvested during dry weather
- Harvesting is done at grain moisture of ≤ 14%
- Cleaning machine after harvesting each variety to avoid mixing
- Ensure that ideal crop nutrition was practiced
Post Harvest Handling...

**Transportation:**
- Each variety is transported alone. Must to avoid any contamination.
- Have a movement permit if across more than one county boundaries.
- Where possible tracks must be sealed after supervised loading.
- Weights are recorded.
Certified seed production...

- **Post Harvest Handling:**
  - Sun/machine drying (if drying is needed)
  - The seed is assigned a lot number by
  - KEPHIS Cleaning: cleaner inspected and passed by KEPHIS after/before cleaning every variety
  - Cleaned seed is sampled by KEPHIS before chemical treatment/dressing
  - Treated seed must be inspected & passed by KEPHIS for labelling, packaging and storage or releasing to the farmers/market
Clean seed ready for dressing and packaging

Cleaned seed is sampled by KEPHIS before chemical treatment/dressing
Prescribed seed standards for seed certification (ISTA)

<table>
<thead>
<tr>
<th>Seed class</th>
<th>Germination %</th>
<th>Moisture %</th>
<th>Pure seed min</th>
<th>Inert matter %</th>
<th>Other crop seed max</th>
<th>ODV (max)</th>
<th>Object-able weed seed (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation seed</td>
<td>85</td>
<td>12</td>
<td>98</td>
<td>2</td>
<td>10</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Certified seed</td>
<td>85</td>
<td>12</td>
<td>98</td>
<td>2</td>
<td>10</td>
<td>-</td>
<td>20</td>
</tr>
</tbody>
</table>

Field standards

<table>
<thead>
<tr>
<th>Seed class</th>
<th>Off-type</th>
<th>Pollen shading</th>
<th>Object-able plant</th>
<th>Plant heads affected by designated disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation seed</td>
<td>0.050</td>
<td>-</td>
<td>0.010</td>
<td>0.10</td>
</tr>
<tr>
<td>Certified seed</td>
<td>0.1</td>
<td>-</td>
<td>0.020</td>
<td>0.50</td>
</tr>
<tr>
<td>CLASS OF SEED</td>
<td>CODE</td>
<td>LABEL COLOUR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------</td>
<td>--------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breeder seed</td>
<td>BR</td>
<td>White</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-basic (super elite)</td>
<td>PB</td>
<td>White</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic (elite)</td>
<td>B</td>
<td>White</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certified 1&lt;sup&gt;st&lt;/sup&gt; generation</td>
<td>C1</td>
<td>Blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certified 2&lt;sup&gt;nd&lt;/sup&gt; generation</td>
<td>C2</td>
<td>Pink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certified 3&lt;sup&gt;rd&lt;/sup&gt; generation</td>
<td>C3</td>
<td>Pink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certified 4&lt;sup&gt;th&lt;/sup&gt; generation</td>
<td>C4</td>
<td>Pink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certified 5&lt;sup&gt;th&lt;/sup&gt; generation</td>
<td>C5</td>
<td>Grey</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Packed seed ready for storage and marketing

• Post Harvest Handling:

**Packaging**

• Branded bags
• Well Labelled to show
  ➢ Growers/merchants name
  ➢ Show variety name,
  ➢ Class of the seed
  ➢ Lot Number
• Net weight 50 kg
Certified seed storage

Seed should be stored under the following conditions

- Moisture content \(< 12\%\)
- Relative Humidity 50-60 \%
- Clean bagged seed stored in insect and rodents proof warehouses
- Rodents controlled by traps and poisons, complete exclusion, sanitation and sanitation
- Insects controlled by insecticides and fumigants
- Use safest fumigants that will not reduce germination
Certified seed storage

The stored seed must be monitored for the following factors:

1. Seed viability [germination tests done routinely]

1. Seed vigour on germinated seedlings

2. Storage space sanitation by fumigating the stores against rodents and weevils
Marketing/Distribution

• It is very critical for the certified produced seed to be disseminated to the relevant end users in time.

• These end users include
  - Farmers
  - Seed merchants
  - Stockists
  - Other institutions involved in seed bulking
Thank you for listening