NATIONAL PERFORMANCE TRIALS (NPTS)

Presented at:
The Seed Production Course, SEMIS, University of Nairobi, 26th – 31st May, 2014

Simeon Kibet,
General Manager, Quality Assurance,
Kenya Plant Health Inspectorate Service
(www.kephis.org)
KEPHIS is mandated to:

- Grant proprietary rights on plant varieties
- Maintain an index of existing plant varieties
- Regulate introduction of new plant varieties

KEPHIS regulates introduction of new plant varieties, with two key functions:
Conducting tests for Distinctness, Uniformity and Stability (DUS) to establish variety identity for purposes of grant of Plant Breeder’s Rights (PBR) and release for commercialisation.

Undertaking National Performance Trials (NPT) on new crop varieties to determine their adaptability for purposes of release for commercialisation.
A variety
- end-product of lengthy breeding process
- ultimate goal = improvement

Task of national seed program
- regulate production & supply of new varieties
- with better adaptability
- greater potential for yield & agronomic traits
- for enhanced profitability to farmers
Tests are conducted to determine the Value for Cultivation & Use (VCU) of new varieties, where:

- candidates are grown & observed alongside existing varieties (checks/controls)
- in single trial on several locations within target agro-ecological zone
- tests for minimum 2 seasons
- superior candidates released
Conducted to determine the adaptability of a variety in different ecological zones in Kenya

Factors examined are:

1. Yield
2. Time to maturity
3. Standability
4. Disease/pest incidence
5. Tolerance to abiotic stresses (drought, frost)
6. Lodging

The candidate variety should perform similar to or better than the check variety
Purpose of NPT

- To determine their adaptability
- To determine value for cultivation and use (VCU)
- For the purposes of release for commercialisation
Growing of NPTs

- Candidates are grown & observed alongside existing varieties (checks/controls)
- In single trial on several locations within target agro-ecological zones
- Tests done for minimum 2 seasons
Steps involved in Planning of Growing Trials (NPT)

a. Site identification

- Several representative locations
- Experimental field:
  - uniform fertility & terrain
  - free from shade, stumps, anthills, rocks
  - minimal slope
  - known history
b. Land Preparation

- Good seedbed gives a better crop stand
- Seedbed - uniform, level, desirable tilth
- 20-40% soil moisture most ideal for land preparation.
c. Submission of Seed

- Set deadline for seed submission
- Adequate, good quality seed
- As per number (e.g. maize, beans) or weight (e.g. small cereals) required
- Standard submission form
Steps involved in Planning of Growing Trials (NPT) cont’d…

**d. Seed Counting & Packaging**

- Breeder packages seeds in suitable packets by site & replicate.
- Each packet - seed for one plot, labeled:
  - Crop
  - Kit (test zone)
  - Site name
  - Site number
  - Plot number
  - Entry number
  - Replicate number
e. Check Varieties

- Selected by the NPTC
- Links performance of candidate with that of released, widely cultivated varieties
- At least one check for each VCU category e.g. maturity
- Included should provide adequate range of parameter
Experimental Design

- Design based on No. of entries
- Three replicates - minimum
- RCBD - up to 12 entries
- Alpha-lattice - more than 12 entries
- Randomization – centrally, site by site
- Restricted randomization where necessary e.g. maize OPVs vs hybrid
- All entries assigned codes
Field Layout

- Plots sequenced in left to right orientation
- Plot shape preferably rectangular
- Field layout - serpentine
- For sloppy sites, replicates & crop rows run along contours
Agronomic Management

- Timeliness & due diligence in all operations:
  - Sowing
  - Fertilizer – type, rate, regime
  - Thinning
  - Weeding
  - Pest/disease control
  - Harvesting
- Border/guard rows - same treatment as plots
- Ensure security of trial
Steps involved in Planning of Growing Trials (NPT) cont’d…

Data Collection

- Yield - most important parameter
- Other parameters also assessed
  - field observations
  - laboratory analysis
- Field observations supplemented with notes on various events, activities, factors, etc
Data Collection cont’d …

a. General Rules to Observe

- Avoid guesswork
- Always read instructions carefully before planting & before recording data
- Record directly into the data sheet
- Use discretion to reach decision in case of problem
- Avoid changing data collecting personnel
Data Collection cont’d…

b. Sampling

- Necessary for characters requiring observation of individual plants
- Representative sample – covering whole range of conditions
- Select sample objectively, avoid bias
Data Collection cont’d…

c. Data Recording

- Using standard data sheet bearing (basic) information on:
  - Site name
  - Site number
  - Replicate numbers
  - Block number (depending on design)
Steps involved in Planning of Growing Trials (NPT) cont’d…

Data Collection cont’d…

c. Data Recording (cont’d)

- Plot number
- Entry name
- Entry number
- Entry type (e.g. OPV, hybrid)
- Source/owner of entry
- Status of entry (candidate or check)
- Other crop-specific data to collect
Data Collection cont’d…

d. General VCU Data

1. Name of person recording data
2. Date of planting
3. Days to emergence (50% seedlings emerged)
4. Stand count at thinning
5. Days to 50% flowering
6. Pest scores
7. Disease scores
8. Lodging scores - RL, ST
9. Plant height
Data Collection cont’d…

d. General VCU Data (cont’d)

10. Maturity dates
11. Stand count at harvest
12. Harvest data:
   - grain yield
   - number of ears/heads harvested
   - pod load
   - tillering ability
   - moisture content
   - rots, etc
Data Entry

- Done immediately after recording in the field
- Errors checked when corrections are still possible
- Standard datasheet in all sites - ease of data management & analysis
Steps involved in Planning of Growing Trials (NPT) cont’d…

Data Analysis

- Analysis & presentation of data – 3 stages:

  1. Within site
     - Data for each site summarized to provide
       - entry means
       - estimates of precision for the site
Data Analysis (cont’d)

3. Over years

- Entry means summarized on a table classified by entries & No. of testing years
- Table displays
  - estimates of individual entry performance
  - combined precision in all sites over years
- Basis of VCU (release) decisions
National Performance Trials Committee (NPTC)

Functions of the NPTC

- Oversee the conduct of performance trials
- Review performance trials protocols, guidelines and minimum number of candidate varieties to constitute a performance trial
- Evaluate performance trials report & make recommendations to the release committee
- Review applications for performance trials
- Provide feedback to the applicants on performance of their entries in the performance trials
- Develop rules for the conduct of meetings
- Invite applicants who had candidate plant varieties in the trials to attend trials committee meetings
Data Reporting & Decisions

- Secretariat (KEPHIS) presents analyzed data to NPTC
- NPTC makes recommendations to be discussed by NVRC
- Decision-making procedures
- Objective
- Consistent
- Based on clear criteria & standards set for each crop, agroecology or technology
Recommendations by NPTC includes:

- Varieties for full release
- Varieties to be continued
- Varieties withdrawn
Functions of the NVRC

- Consider the report of the NPTC and its recommendations
- Consider the DUS report
- Approve and release qualifying varieties
- Determine fees for any application under these regulations
- Moderate on any disputes relating to these regulations
- Provide advice on policies and procedures on performance trials
Gazettment of Release Varieties

- KEPHIS to publish the names of the released varieties in the Gazette within 14 days of the Release Committee

- KEPHIS to update and publish the National Variety List annually in the Gazette

- KEPHIS to maintain a Register of all applications for performance trials and any exemptions granted
THANK YOU