Towards Quality Seed of Improved Stress-Resilient Maize varieties

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STAK 7th Seed congress, "Facilitating Business in Quality Seed through Technological Innovation and an Enabling Environment”, 7-8 Nov 2018, Kenya School of Government, Nairobi, Kenya
Lack of finance
Poor access to farm inputs
Poor access to markets
Weak extension support
Climate Change
Pests and diseases
Heavy workload
Numerous seed companies
Array of new ICT tools
Harmonized seed regulations
Research institutions
CGIAR research centers

CIMMYT is one of 15 CGIAR members in 65 countries, in close collaboration with hundreds of partners.

Through collaborative research, partnerships and training, CIMMYT works throughout the developing world to improve livelihoods and foster more productive, sustainable farming.
CIMMYT Focus on Maize Breeding and Seed Systems

- Improving yield, stress resilience, nutritional quality, and nutrient use efficiency of maize in the tropical regions in sub-Saharan Africa
- Improved germplasm with capacity to perform well under both stress-prone/sub-optimal and optimal/favourable environments
- **Strengthening maize seed systems through PPPs** → targeted development and delivery of elite stress resilient and nutritionally enriched maize seed

- Variety releases
- Varieties NPT testing
- Product allocation
- Breeder/pre-basic
- Seed production research
- Support to seed production
- Demonstration of newly released varieties
- Promotion of newly released varieties
- Technical backstopping to seed companies
Continued improvement of new stress tolerant maize hybrids compared with genetic and commercial checks

Grain yield (t/ha) under drought

Makumbi et al. 2018
Demonstrated continuing improvement of new maize inbred lines

The improvement in GY of Africa-adapted CIMMYT inbred lines is estimated to be 1.4% per year (39.3 kg ha$^{-1}$ year$^{-1}$).

Hybrid combinations among productive inbred lines has enhanced uptake of new hybrids.

Worku et al. 2016
Products and services from CIMMYT

- **Maize germplasm**: Inbred lines, Hybrids, open pollinated varieties (OPVs), testers, segregating populations, germplasm pools and Gene Bank accessions,

- **Services**: DH line production, MLN screening, quality testing (finger printing) and molecular markers

- **Training**: Maize breeding, seed production and seed business

- **Publications**: Manuals
CIMMYT Elite Maize Product Development and Deployment Flow

Stage 1

Regional On-station Trials

Regional On-Farm Trials

Regional Product Advancement Meetings / Stage-Gate

Stage 2

Stage 3

Client Preferences; Comparative Advantage; Product Targets

Product Announcement to Partners

Allocation and Licensing of Products to Partners

National Performance Trials

Varietal Release / Registration by Partners

Seed Scale-up

Adoption by Farmers

Impact Assessment

Breeders screen inbreds lines

Breeding Funnel

Farmers’ Variety & Trait Preferences

Feedback from Partners

Early generation seed supply

Prasanna, 2017
Why do we worry about seed quality?

• Quality seed is a key for high productivity, production, and food security
• Quality will promote seed sales → strong seed sector for businesses and farmers, in Kenya and the eastern Africa region.

• We know the challenges
• **How do we ensure quality all along the value chain to reach the farmer?**
QUALITY COMPONENTS OF SEED

A = Genetically pure and free from other seeds

B = Genetically pure and free from pests and diseases

C = Seeds free from diseases and physical mixtures

D = Desired goal

GENETIC PURITY

PHYSICAL PURITY (ANALYTICAL)

SEED HEALTH

Modified from: YONAS SAHLU  Ethiopian Seed Enterprise
Causes of low seed quality

- Male is not pure
- Wrong male planted
- Wrong breeder seed planted, mislabeling
- Female not completely detasselled

Physical mixtures can happen during harvest, storage and processing.

QA/QC can assist seed companies to produce quality seed.
Quality is key in maize seed production

- Manuals address seed quality at all stages in seed production process
- Copies prepared and disseminated soft and hard copies
Quality Assurance/Quality Control

- QA/QC protocols need to be rigorously implemented throughout the seed value chain
- Genetic purity and genetic identity of the materials under production
Quality is key in maize seed production

Transfer of knowledge and skills through CIMMYT organized QA/QC training for seed companies and NARS in ESA in 2017

Regasa et al. 2017
International Maize Improvement Consortium (IMIC)-Africa

IMIC-Africa Launch Meeting-Harare, 28 May 2018

**IMIC-Africa**: Partners in accelerated development and deployment of elite maize inbreds and hybrids

- Membership consortium
- Services – Germplasm (MuD, Training, Field days, Testing, DH, MLN, MM, FAW, Insects etc)
Thank you for your interest!