

## Background

The genetic potential of sorghum and millets is under-exploited in Uganda. There is over-reliance on the traditional conventional breeding schemes which account for the limited development of market-demanded varieties. Climate change requires breeding programs to deliver varieties faster. Innovative breeding approaches and improved methods of measuring traits for faster genetic gains are must-have capabilities for dynamic and futuristic breeding programs. Recent Breeding Program assessments identified gaps such as limited utilization of innovative breeding approaches and mismatch between improved varieties and target niche markets' needs. CGIAR - NARES breeding network is innovatively integrating demand-led breeding following market segment and target product profile approach, with breeding innovations such as marker applications and improved breeding schemes to accelerate delivery of impactful varieties to farmers and other end users.

## Challenge

- Breeding effort not aligned to market segments and Target product profiles .
- Limited application of breeding innovations e.g Markers and Quantitative breeding approach

## Solutions

- CYMMIT supported NARS in conducting product development team meetings to identify priority Market segments
- CYMMIT supported NARS to conduct breeding program evaluations to identify bottlenecks for genetic gains in breeding pipelines
- CYMMIT and EiB established Low density SNP genotyping framework at Intertek in support of NARS breeding programs



Kakeeto, R., Awori, E.K., Adikini S., Wandulu, J., Kasule, F., Aru, C., Okiasi, F., Malomo, M., Mayanja, I., Biruma, M, Okello D.K, & Ugen, A.M  
National Agricultural Research organization (NARO) - National Semi-Arid Resources Research Institute (NaSARRI), P.O Box 56, Soroti, Uganda  
Key e-mail contact: kakeetor@gmail.com

## Harnessing MS and TPP approach, and marker applications in breeding process improvements for sorghum and millets in Uganda

### Key Insights

1. Implementing market segment and target product profile approach improves the focus of breeding
2. Routine parental and F1 QC ensures that pure lines are used as parents and pure hybrids are advanced for genetic gain in target pipelines.
3. Increased collaboration in breeding practice is the cornerstone for scaling up program size and attaining anticipated genetic gain for shared network breeding pipelines



Routine parental and F1 QC now in place in Uganda and in other NARES centers

1,600 samples submitted so far; 5,000+ projected in 2024

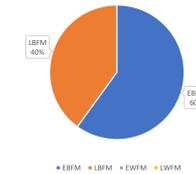
55% (Early 2024)

93% (Late 2024)

NaSARRI-NARO sorghum success rate in true F1 verification

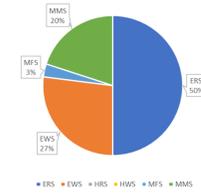
## Current implementation status

- Developed Crosses for ERS (sorghum) and EBFM (Finger millet) market segments, now at F1
- Two F1s QC Cohorts have been implemented in sorghum with progressive improvements
- Testing advanced breeding populations for Product Profile traits in niche market segments
- Aligning early and advanced population to priority market segments for sorghum and finger Millet



Priority Market segments for Finger millet in Uganda

EBFM = Finger millet, N, EAF, food/brewing, red/brown, sub-humid mid altitude/cold high altitude, rainfed, early  
LBFM = Finger millet, N, EAF, food/brewing, red/brown, sub-humid mid altitude/cold high altitude, rainfed, medium/late



Priority Market Segments for Sorghum in Uganda

ERS = Sorghum, N, EAF, food/feed/brewing, red/brown, semi-arid lowland/sub-humid mid altitude, rainfed, early/medium  
EWS = Sorghum, N, EAF, food/feed/brewing, white/cream, semi-arid lowland/sub-humid mid altitude, rainfed, early/medium  
MMS= Sorghum, N, EAF, malting, red/brown, sub-humid mid altitude/cold high altitude, rainfed, medium/late  
MFS = Sorghum, N, EAF, fodder, grain color NA, semi-arid lowland/sub-humid mid altitude, rainfed, medium

## What are your plans to sustain?

- Routinely align breeding efforts to target MS and TPPs
- Nurture and maintain fruitful CGIAR -NARES and NARES -NARES collaboration for infrastructure access and staff capacity building.
- Source for additional funding for capacity enhancement for infrastructure, short- and long-term training
- Organize additional training sessions for breeding process optimisation
- Embrace a continuous improvement mindset

## Acknowledgements

Supported by

BILL & MELINDA GATES foundation

