

# New crop and fodder genotypes for sustainable intensification in semi-arid agro-ecologies of Tanzania

<sup>1</sup>P. Okori, <sup>2</sup>B. Jumbo, <sup>2</sup>D. Makumbi, <sup>1</sup>NVPR. GangaRao, <sup>3</sup>A. A. Kimaro and <sup>4</sup>E.Swai

<sup>1</sup>International Crops Research Institute for the Semi Arid Tropics, <sup>2</sup>International Maize and Wheat Improvement Center, <sup>3</sup>World Agroforestry Center, <sup>4</sup>Agriculture Research Institute-Hombolo

## Key messages

- New highly productive and resilient varieties of legumes (groundnut, pigeonpea & bambara nut; cereals (drought tolerant Quality Protein Maize (QPM), sorghum & pearl millet), have been developed. Fodder tree species such as *Glyricidia sepium* has been evaluated and shared.
- These new varieties, when supported with appropriate scaling models, will provide farmers with new options for production. They will increase productivity by 2-3 fold and enhance options for land management, nutrition and income for smallholder farming communities.

## Objectives and approach

**Purpose:** To evaluate and deliver new crop and fodder varieties for sustainable intensification in dryland agro-ecologies of central Tanzania (Manyara, Kongwa).

**Approach:** Released and test lines were evaluated on-farm for inclusion in sustainable intensification package on researcher and farmer managed plots. Farmer evaluations were conducted to identify farmer and market variety preferences and inform variety release. Disease free fodder species were evaluated on-farm and scaling and inclusion in livestock feeding regimes tested. Applications for new variety releases were made.

## Key results

### New resilient crop and fodder varieties developed and deployed

- **Cereals and legumes:** Two drought tolerant QPM varieties (CZH132019Q (T283-34) & CZH132003Q (T283-31), have been released (Table 1).
- **Legumes:** One groundnut variety and 4 pigeonpea varieties namely Ilonga 14-M1, Ilonga 14-M2, Kiboko and Karatu-1 have been evaluated and readied for inclusion in intensification activities.
- **Fodder trees:** Local leguminous trees and exotic species *G. sepium* have been tested for local adaptability and readied for promotion.

### Crop improvement pipelines strengthened

- **Bambara nut:** The Bambara nut variety (Nalbam 3) had 126% yield advantage over a local check with grain yield of 2374 kg/ha.
- **Pearl millet.** Twenty five new pearl millet genotypes were evaluated with 53% yield advantage over local checks and are ready for National Performance Trial (NPT).
- **Sorghum:** Two sets of test lines were evaluated leading to identification of lines and released with up to 2 tons per ha grain yield.

## Significance and scaling potential

- **Significance:** New crop and fodder genotypes suitable for increasing and stabilizing, production, and productivity and related benefits of nutrition and income outcomes have been identified.
- **Scaling:** Scaling models are being evaluated and partnerships built for scaling up and out of these improved materials in these communities.

## Partners



**Photos:** A- Farmers select QPM and pigeonpea varieties in Njoro and Laikala villages respectively; B- Multiple cropping systems involving *G.sepium* and other legume-cereal crops tested and promoted; C-New crop varieties under evaluation in Mlali and Molet.

**Photo credit:** W. Munthali and A. Kimaro

| Name             | Pedigree                          | Lysine | Tryptophan |
|------------------|-----------------------------------|--------|------------|
| <b>CZH132019</b> |                                   |        |            |
| Q                | CML491/CZL083//CZL134             | 0.074  | 0.301      |
| <b>CZH132007</b> |                                   |        |            |
| Q                | CZL135/CZL1311//CML511            | 0.331  | 0.085      |
| <b>ZS261</b>     | ZS261 (QPM commercial check)      | 0.345  | 0.078      |
| <b>PAN 53</b>    | PAN 53 (non-QPM commercial check) | 0.245  | 0.044      |

**Table 1.** Essential amino acid profile (Lysine and Tryptophan) in newly released QPM maize varieties by Africa RISING team when compared to commercial hybrids in 2015.