

# New dryland legume and cereal varieties for genetic intensification in semi-arid ecologies of central Tanzania

<sup>1</sup> Wills Munthali, <sup>1</sup> Peter Ngowi, <sup>2</sup> Oswin Mponda, <sup>1</sup> James Mwololo, <sup>3</sup> Swai Elirehema, <sup>5</sup> Bekunda Mateete, and <sup>1</sup> Patrick Okori  
<sup>1</sup>ICRISAT, <sup>2</sup>ARI-Naliendele Mtwara, <sup>3</sup>ARI-Hombolo Dodoma, <sup>4</sup>ARI-Ilonga, <sup>5</sup>IITA

## Challenges & Study objective

- Less than 10% of smallholder farmers in Dodoma and Manyara use improved seed, especially of dryland cereals and legumes.
- We find a yield gap of over 50% for the target crops in the region, but could be higher compared to the national averages.

**Main study objective:** To evaluate and register resilient and highly productive dryland cereal and legumes crop varieties for the central semi-arid ecologies of Tanzania.

## Introduced technologies

- New disease resistant and early maturing groundnut.
- Adapted and high yielding sorghum.
- Adapted and high yielding pearl millet

## Evidence

1. The new groundnut varieties have yield advantages of up to 64% over Mnanje and over 120% over land races (**Table 1a**).
2. New sorghum and pearl millet varieties have up to 44 & 97% yield advantage respectively, over local material (**Table 1b**).
3. New groundnut varieties have superior economic and social benefits (**Table 2**).



Plate.1. Following selection and variety release (**right**), there is need to strengthen delivery systems (**middle**), in order to deliver social benefits to communities (**left**)

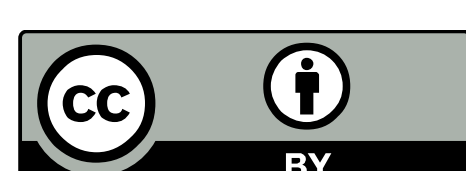
## Approaches of taking technologies to scale

1. Leverage on other scaling-out investments that work in the region including public and private sector agencies.
2. Strengthen seed systems especially early generation seed production.
3. Leverage on informal seed systems as a short but quick approach to stimulate demand for improved varieties.

Table 1a. Performance of proposed groundnut varieties for release during 2016-2017 last season evaluation

Genotypes	Grain yield (kg/ha)	Yield advantage (%)	Farmer rank	Traits underpinning farmer ranking
ICGV-SM 02724	1486	64.93	1	Yield, seed size
ICGV-SM 03519	1127	25.08	2	Taste, drought tolerance
ICGV-SM 05650	970	7.66	3	Yield, drought tolerant
Mnanje	901		4	Seed size
Mean	1121			
Fpr	<.001			
sed	112.4			
CV%	22.4			

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Table 1b. Performance of proposed sorghum and pearl millet varieties for release in 2016-2017

Sorghum				
Genotype	Grain yield (kg/ha)	Yield advantage	Farmer ranking	Traits underpinning farmer ranking
Gambella 1107	4604	44.14	1	Panicle size, seed size
IESV 92028	4080	27.73	2	Panicle size
IESV 23010	3923	22.82	3	Panicle size
Lugugu check	3194			
Fpr	0.017			
SED	398.54			
CV%	17.5			
Pearl millet				
SDMV 96053	1592	97.5	1	Panicle size, earliness
SDMV 94005	1448	76.6	2	Panicle size, earliness
IP 8774	1104	36.9	3	Drought tolerant
SDMV 95005	1340	66.2	4	Drought tolerant
SDMV 96063	978	21.3	5	Earliness
IP 9976	1052	30.5	6	Drought tolerant
Local check	806		8	Drought
Fpr	0.496			
SED	392.39			
CV%	34.5			



Plate. 2. **Top left** Participatory variety selection (PVS) on Groundnut; **Top middle-** PVS on Sorghum; **Top right** PVS on Pearl millet

Table 2. Selected benefits of the new groundnut varieties assessed using sustainable intensification indicators

Technology	Economics			Human		
	Gross margins (USD)			Food availability (Kg of grain)		
	Local variety	New variety	Indicator change (%)	Farmer practice	New variety	Indicator change (%)
Mnanje	563			20		
ICGV-SM 02724		1019	28.85		100	60.00
ICGV-SM 03519		739	13.54		50	33.33
ICGV-SM 05650		617	4.56		30	9.09

## Proposals for the future

- Study seed system scenarios to gain insights into constraints and opportunities for improving under performance.
- One agriculture, one health: Variety/agronomy & end-use integration.
- Resilient and nutrient dense breeding.

## Partners

