

## **Participatory sorghum development increased number of functional varieties and genetic diversity for climate resilience among smallholder farmers in Chirundu.**

Lloyd Mbulwe<sup>1</sup> (macloydm.zari@gmail.com), Juliet Nangamba<sup>2</sup>, Charles Nkhoma<sup>2</sup>

<sup>1</sup> *Sorghum & Millets Improvement Programme/Crop Improvement and Agronomy, Zambia Agriculture Research Institute (ZARI), Chilanga, Zambia* ; <sup>2</sup> *Community Technology Development Trust (CTDT), Lusaka, Zambia*

Community Technology Development Trust has collaborated with Zambia Agriculture Research Institute from 2019. The major goal has been to develop a portfolio of farmer-preferred sorghum varieties that address the diversity of farmer needs, contribute to climate change adaption and enhance functional sorghum diversity in local communities. Farmers actively participate in variety development. Local and improved open-pollinated varieties are accessible in farmer-managed seed systems. Participatory Variety Development has increased the diversity of sorghum cultivars among smallholder farmers, with traits desired for local growing conditions and uses. Therefore, production and productivity is expected to increase. These cultivars have relatively big grains, high yielding, drought tolerant, short and early maturing. These traits are highly desired in this drought prone area, hence food security, genetic diversity and ability to adapt to reduced rainfall is being realised.

Farmers were interested in combining traits found in the cultivars ‘Kuyuma’ a short variety and ‘Sima’ a tall variety with big grain. The resulting preferred varieties ‘Kuyuma/sima’ are high-yielding, early maturing, short white sorghums with big grains and tolerant to drought. This was achieved by using simple but effective pollination techniques that could be implemented with farmers in their fields. ‘Kuyuma’ was crossed with ‘Sima’ under the guidance of the Sorghum Breeder. Head to row selections of preferred lines were done from a segregating population of 9000 F2 plants. The result was development of 7 distinct stable lines at F5 designated as ZSV-108, ZSV-110, ZSV-134, ZSV-199, ZSV-251, ZSV-208 and ZSV-261. The lines are undergoing variety testing and evaluation in replicated trials in farmer fields within the agro-ecology.

The lines qualify for formal variety release and fit into farmer contextual needs. The desired outcomes of the PVD process were; (i) enhanced involvement of farmers in variety development, (ii) increasing sorghum genetic diversity and (iii) creating opportunities for farmers.

### References:

1. Sydney Phiri et al., HSOA Journal of Food Science and Nutrition, 2022.
2. Arun Kumar et al., Hand Book on Farmers Rights, 2022, Shyam Prasad, 3-36.
3. Lloyd Mbulwe, and Oluyede Clifford Ajayi, European Journal of Agriculture and Food Sciences, 2020.