Use of climate and nutrition smart millets, legumes and cucurbit germplasm for improved livelihoods

The reliance on maize by most communities in Southern Africa as the chief crop is unsustainable. There is growing concern about the future of crop production in Africa due to low crop diversity, lack of resilience and adaptation of major staple crops to marginal and low input production systems that typify subsistence farming. Crop diversification spreads risk associated with single crop failure and promotes food system resilience. African traditional crops such as millets, legumes and cucurbits are nutritious and adapted to the different ecological niches but are being lost due to the dependence on a few major crops that cater for 80-90% of our total dietary needs. There is need to enhance climate smart and nutrition smart agriculture to reduce the impact of climate change and malnutrition. Accordingly, Prof M. Maphosa's area of research is mainly the re-evaluation of the role of neglected and underutilised crop species that are resilient and nutritious such as millets, legumes and cucurbits. These have played a significant part of our food systems with the major impediment to scalable production being that they have received little focus from mainstream research hence there are no improved varieties, planting material is restricted to a few landraces, seed availability is limited due farmers-to-farmer exchange resulting in low crop productivity, knowledge on recommended production practices is limited and value chains are underdeveloped. The risk of genetic wipeout of diversity in millets, legumes and cucurbits is higher if attention is not given to their conservation, documentation and evaluation of productive landraces for potential commercialisation. Their adaptation and nutritional value makes them the 'crops for the future' in the face of a myriad of challenges for rural farmers in Zimbabwe. Prof Maphosa's research is mainly collaborative with National Gene Banks, Consultative Group for International Agricultural Research partners, National Agricultural Research Institutions and Seed companies. My areas of interest are in morphological, cytological and molecular characterization, classification and population structure which supports germplasm utilisation. Furthermore, Prof Maphosa is interested in genetic analysis, stability and multi-locational trial data analysis for variety development, recommendation and release. Plant genetic resource conservation, mycotoxin management, biofortification and seed science and technology are his passion. Currently, he is running two funded projects "Exploring wide crosses derived biodiversity for climate resilience and food and nutrition security in Eastern and Southern Africa" 2019-2022 FAO- International Treaty of Biodiversity and "Enhancing dryland cereal, watermelon landrace and folk variety regeneration and germplasm conservation" 2022-2024 Global Crop Diversity Trust where he mostly supervises graduate students with interest in plant breeding, biotechnology and seed science.

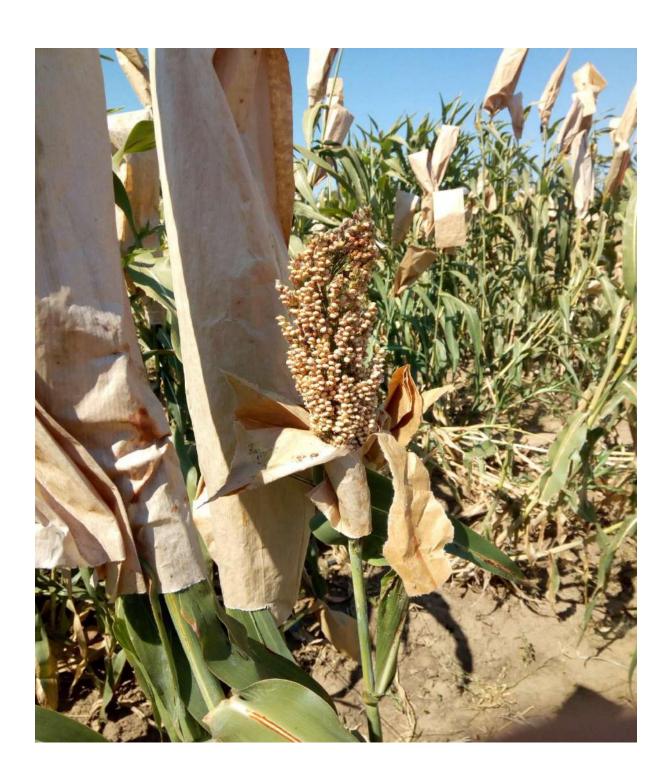**MSc Student (M. Dube) inspecting sorghum heads**

Finger millet research at Lupane State University Experimental Plot

(Prof M. Maphosa in orange T-shirt)

Prof Mcebisi Maphosa inspecting some local sorghum lines

Juice extraction from sweet sorghum

Farmers' Open Day at the Experimental Plot