


➔ 1.2.3  Bucheyeki, Tulole L. (2005). Characterization of sorghum (*Sorghum bicolor* (L.) Moench) landraces collected from Central and Southern Tanzania. (Supervisors: Dr. C. Gwanama, Dr. Mgonja and Dr. M. Chisi).

Sorghum is one of the five most important cereal crops in the world. It is a major source of food in Africa and India. In Tanzania, sorghum is one of five principal cereal crops. Improved varieties and landraces are both available in the country. Production and utilization of sorghum has been affected by biotic, abiotic and socio-economic factors. Utilization of available landraces needs identification of desirable traits through characterization. The general objective of the study was to characterize potential breeding materials by (1) determining the genetic relationships (2) assessing important agronomic traits for sorghum classification. Forty landraces were morphologically evaluated 38 from Tanzania and two (Local 1 and Local 2) from Zambia. These landraces were planted in two blocks and measurements were recorded following the International Board for Plant Genetic descriptive list. A total of 44 morphological descriptors were used: 17 qualitative and 27 were quantitative. Data were analyzed by SPSS and Genstat softwares. Five principal components accounted for 53.64% of the total variability. Grain lustrousness, threshability, days to maturity, hundred seed weight, juice flavour, tillers, leaf number per stem, flowered stems per planting station, tillers per planting station, juice flavour, tiller leaf length senescence, grain cover, grain yield, grain number per panicle, plant height, midrib colour, average weight of five panicles, grain number per panicle, and leaf senescence contributed significantly to the variability. Cluster analysis based on morphological characters revealed two major distinct groups with two subgroups each. However, most landraces within the cluster were not separable. This can be attributed to selfing and seed exchange among farmers. Molecular marker analysis using SSR revealed variations among 41 genotypes, which were grouped into eleven clusters and was able to separate all the landraces. Three sorghum controls, N13, Ochuti and Adiwo each formed independent clusters. Markers Xgap84 and Xtxp320 had high alleles than other markers. These had 7 and 8 alleles respectively. There were no genotype specific makers with the exceptions of Ochuti and N13 controls. Generally, the two dendrograms from morphological and molecular marker analysis were concordant for most groups conserved. The results of this study revealed that, significant genetic variation of sorghum landraces exists in Zambia and central and southern Tanzania and that genetic improvement through breeding is possible. Analysis further revealed that, clustering was not based on area of collection. Results also showed that, molecular markers are more efficient than morphological characterization. Therefore, molecular markers or combination of both should be used according to availability of resources.