Indigenous sheep of Kenya are very important to resource-poor farmers and pastoralists. They have over time adapted to the harsh environmental conditions of the arid and semi-arid lands where they are faced with challenges of persistent droughts, diseases, conflicts and poor nutrition, yet show resistance to gastrointestinal nematodes. In recent years, these indigenous sheep populations have been crossbred indiscriminately to exotic breeds particularly the Dorper. A study was undertaken to determine the level of genetic diversity and relatedness between the various sheep populations and breeds of Kenya. This paper reports results on the genetic diversity and admixture observed using microsatellite DNA markers.