

## **Abstract**

Groundnut (*Arachis hypogea*) is an important food, feed and cash crop in Eastern Africa but its productivity is reduced by a wide range of temperature, humidity, and soil – water deficits coupled with various diseases among them groundnut rosette virus disease, rust and aflatoxin infection of the grain. Delays in the onset of the rainy season reduce the length of the growing period which may result in lower yields. Variety-based tolerance to diseases and drought is a cheap and sustainable way of increasing productivity for smallholder farmers who are the predominant producers. Trials on groundnut varieties were conducted at Alupe and Kibos in western Kenya. The objective of the study was to investigate the risk of seed and grain losses in response to rainfall characteristics during the growing period in Western Kenya region. The treatments were planting time, groundnut varieties and fertilizer treatments. The experimental design was randomised complete block design (RCBD). Yield data was analyzed was subjected to analysis of variance (ANOVA) The effect of rainfall distribution on groundnut seed yield on decadal basis are discussed. Seed yield varied significantly among varieties but was not influenced by fertilizer. Late planted groundnuts were highly affected by pests and diseases, especially leaf rust and rosette, which contributed to low yields. High rainfall during harvesting period led to increased grain rot, especially of the early maturing varieties. This calls for proper timing of planting and harvesting of the groundnut crop. When the same cultivars of groundnuts were grown under a wide range of environmental conditions, temperature and irradiance played a major role in determining crop duration and partitioning of dry matter.