

Dependence on uncertain rainfall and exposure to unmitigated climate risk are major obstacles in efforts to sustainably intensify agricultural production and enhance rural livelihoods. There is generally enough seasonal total rainfall; the challenge is its poor distribution over time and across the season. The amount of water available to plants strongly depends on the rainy season's onset, length, temporal distribution and cessation and can indirectly indicate the climatic suitability of the crop and its chances of success or failure in a season. Thus, the objective was to determine rainfall pattern; temporal distribution, onset, cessation and length of growing seasons in the tropical sub-humid and a semi-arid regions with contrasting rainfall patterns and agricultural potential in central highlands of Kenya. The study was carried out in Maara and Meru South Sub-Counties in Tharaka Nithi County and Mbeere North and South Sub-Counties in Embu County of the central highlands of Kenya (CHK). Central highlands of Kenya cover both areas with high potential for crop production and low potential, attributed to rainfall differences. Meteorological data were sourced from Kenya Meteorological Department (KMD) headquarters and research stations within the study areas. Length of growing season, onset and cessation dates for both Long (LR) and short (SR) rains seasons were determined based on historical rainfall data using RAIN software and derived using various spatial analysis tools in ArcGIS software and presented spatially. Generally there was high frequency of dry spells of at least 5 days length in all the sites with Kiamaogo site having the highest (84 occurrences during LR season) and Kiambere having the least (44 occurrences during LR season) in 10 years. The occurrence of dry spells longer than 15 days in a season was more rampant in the lower altitude parts (semi-arid regions) of the study area as reflected by the Kiambere, Kiritiri, Machang'a and Kamburu sites in both seasons. For the higher altitude regions, average LR onset, representative of the normal/conventional growing period, ranged from 22nd to 26th March to end of April in the region. For the lower altitude region, it ranged from 16th to 30th March. For SR, onset was generally earlier in the high altitude areas with Kiamaogo having the earliest on 13th October. In the low altitude region, onset was comparatively late compared to the higher potential region, but unlike the LR season, spatial and temporal variation was narrower. The high frequency of dry spells more than 15 days long, coupled with the generally low total amount of rainfall receive per season makes agriculture a risk venture. Homogeneity test revealed that the generated onset and cessation dates for the two rain seasons were homogeneous over the 10 years for each of the seven stations. This indicates that, there has been no shift in onset and cessation within the period under consideration. Dynamic derivation of the spatial onset and cessation data at a local scale can be useful in monitoring shifts in onset dates and hence advice small scale farmers and other stakeholders in agriculture sector accordingly in the quest for enhanced agricultural productivity.