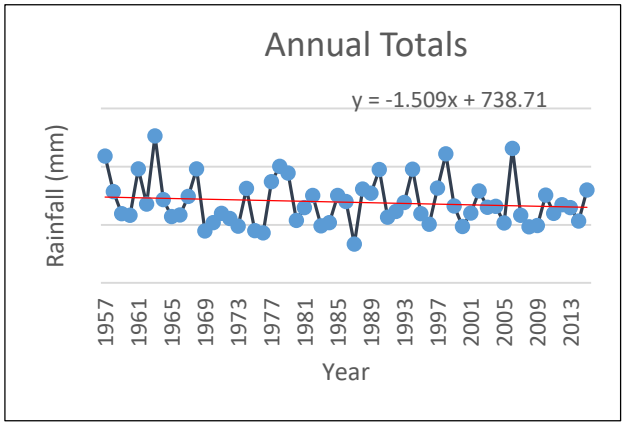
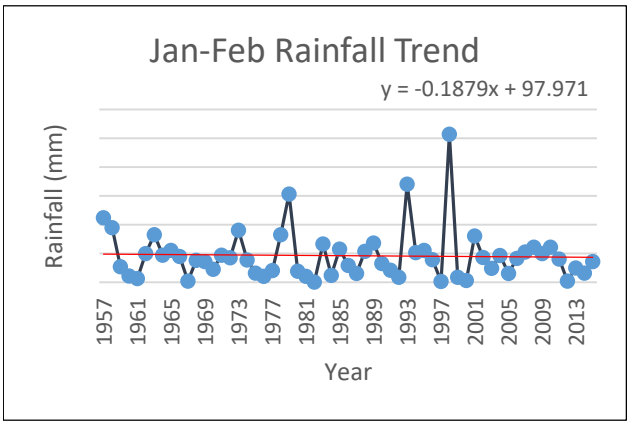
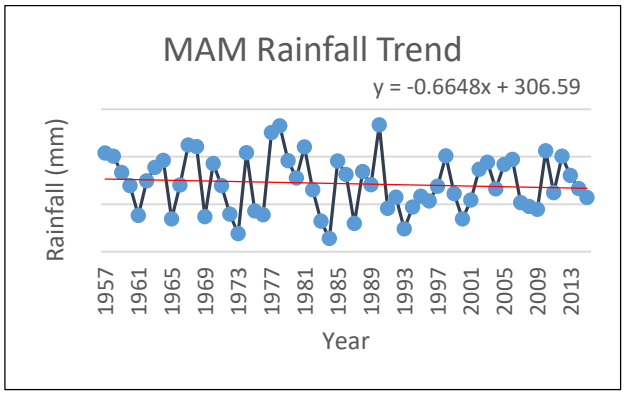
IMPACTS OF CLIMATE CHANGE ON ATHI RIVER CATCHMENT

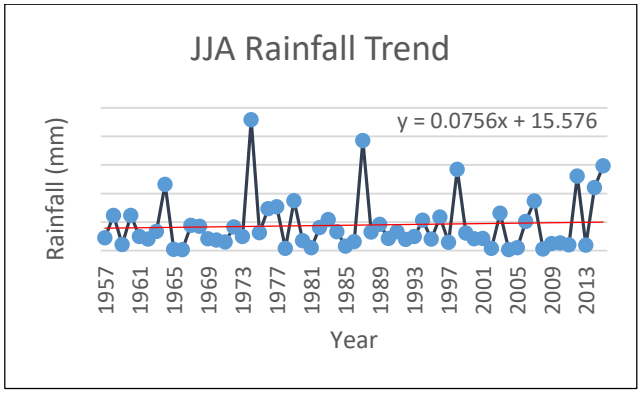
Rainfall Time series for Machakos Meteorological Station

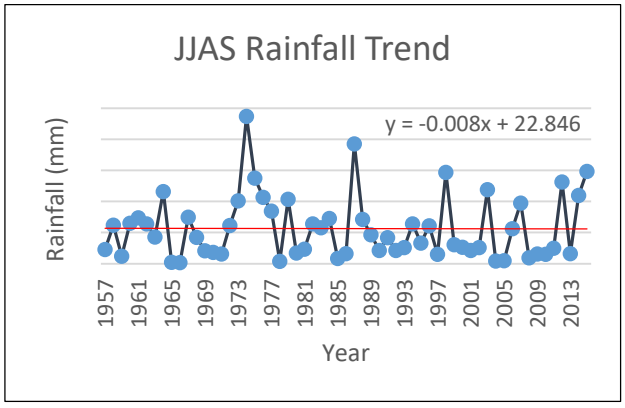
The trend analysis of rainfall in Machakos Meteorological station indicates a decrease of annual and seasonal rainfall in the area as depicted in the figure below. The annual rainfall as plotted from 1957 to 2015 indicates that the rainfall decreases by 1.5 mm annually. The same trend is observed in all the other seasons as rainfall seems to decrease seasonally. In January – February season the rainfall decreases by 0.18 mm annually. In March, April and May rainfall season, the rainfall was decreasing at the rate of 0.66 mm annually. In June, July, August and September, the trend is the same as rainfall was decreasing at the rate of 0.008 mm annually. The October, November and December season the rainfall was decreasing at the rate of 0.64 mm annually. If Machakos Station was taken as a representation of the ARCA, then it can be deduced that the rainfall within the Catchment decreases by a small margin annually.

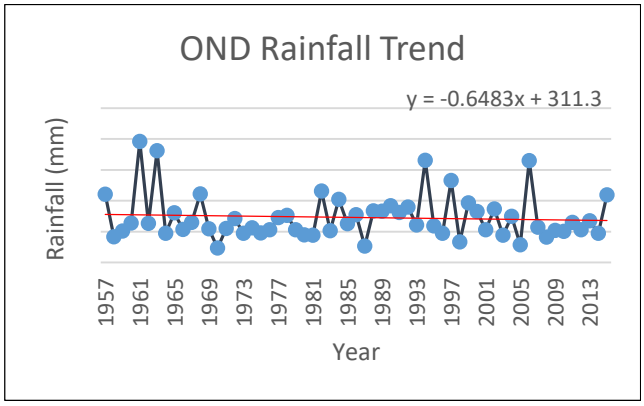






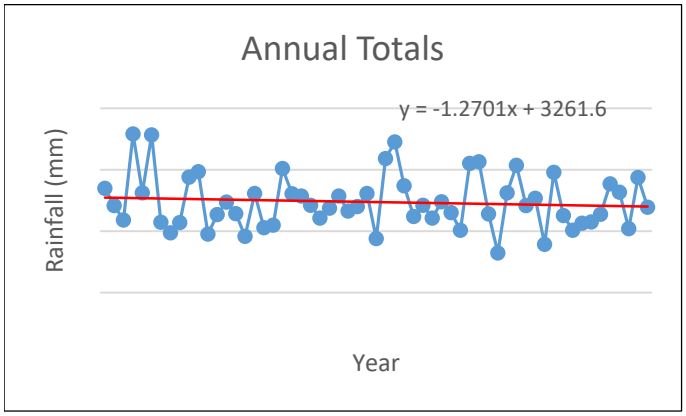


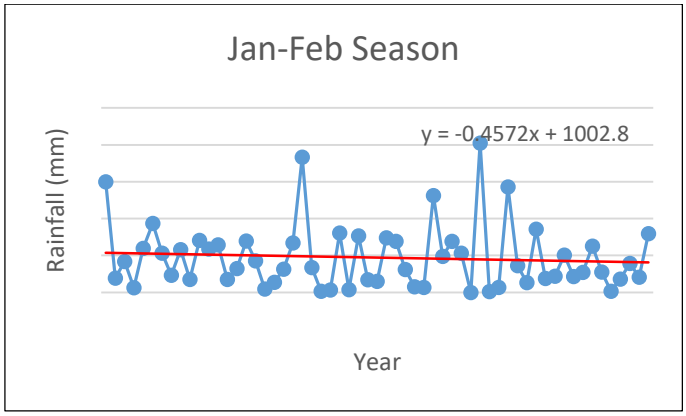


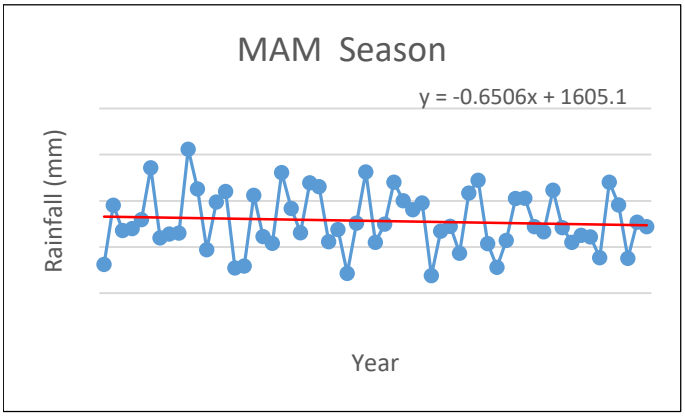


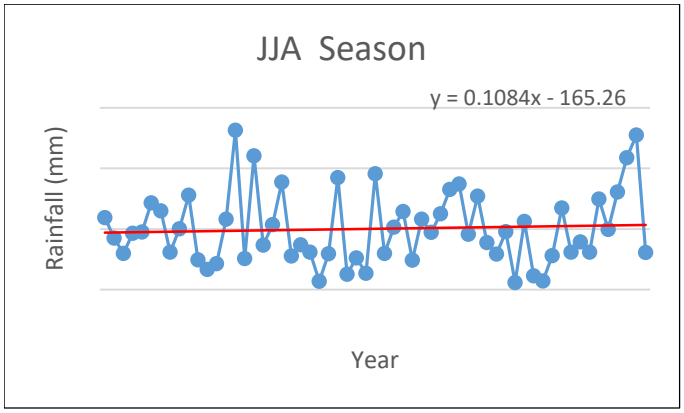
Rainfall Time series for JKIA Meteorological Station

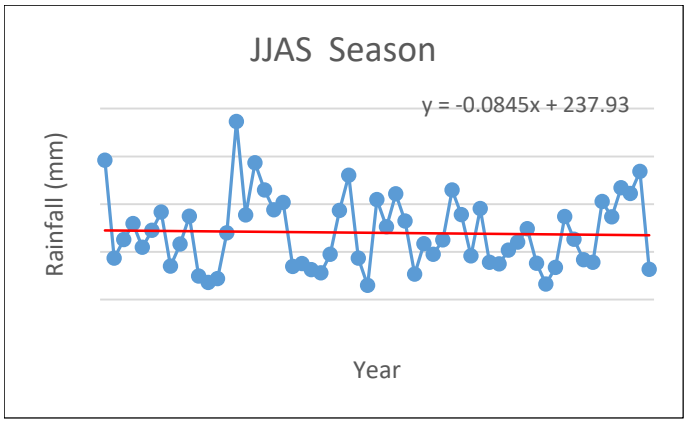
The trend analysis of rainfall for JKIA Meteorological station indicates a decrease of annual and seasonal rainfall in the area as depicted in the figure below. The annual rainfall as plotted from 1958 to 2016 indicates that the rainfall decreases by 1.2 mm annually. The same trend is observed in all the other seasons as rainfall seems to be decreasing seasonally. In January – February season the rainfall decreases by 0.4 mm annually. In March, April and May rainfall season, the rainfall was decreasing at the rate of 0.65 mm annually. In June, July, August and September, the trend is the same as rainfall was decreasing at the rate of 0.08 mm annually. The October, November and December season the rainfall was decreasing at the rate of 0.08 mm annually. If JKIA Station was taken as a representation of the ARCA, then it can be deduced that the rainfall within the Catchment decreases by a small margin annually.

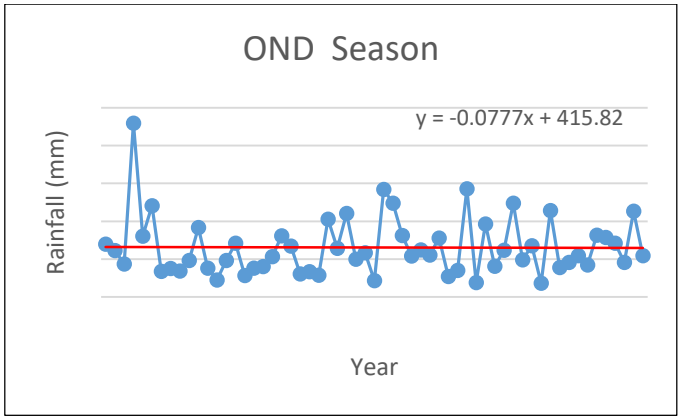






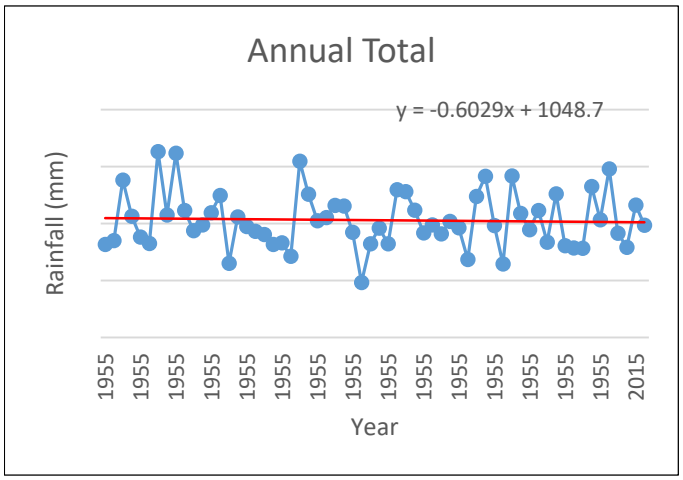


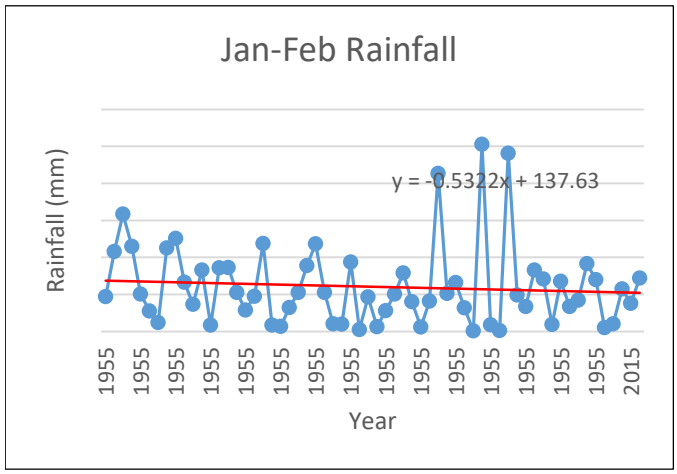


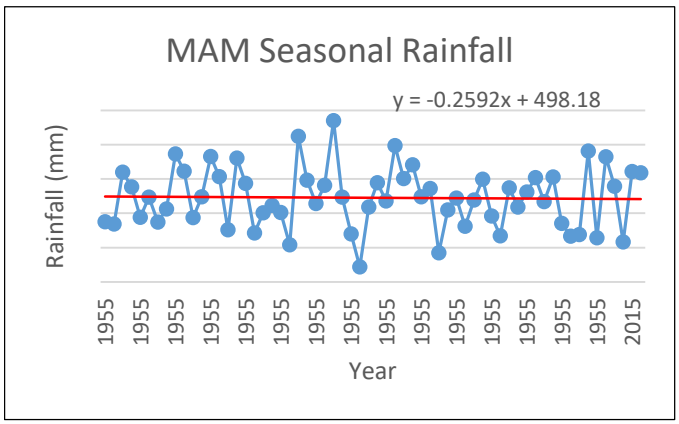


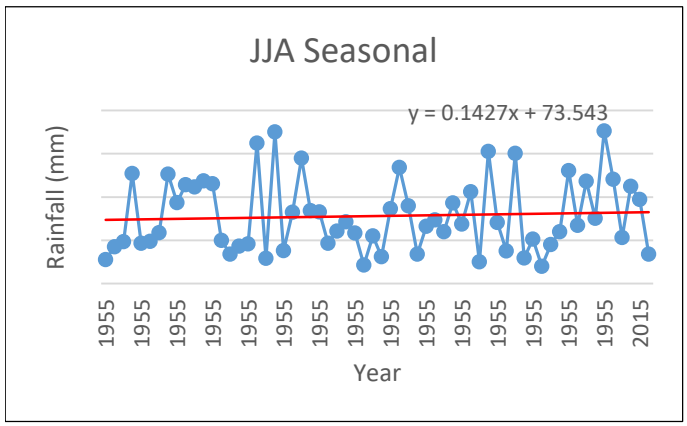
Rainfall Time series for Dagoretti Corner Meteorological Station

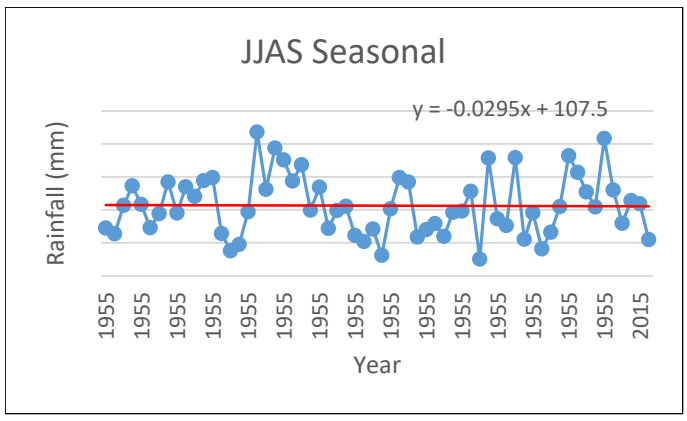
The trend analysis of rainfall for Dagoretti Corner Meteorological station indicates a decrease of annual and seasonal rainfall in the area as depicted in the figure below. The annual rainfall as plotted from 1955 to 2016 indicates that the rainfall decreases by 0.6 mm annually. The same trend is observed in all the other seasons as rainfall seems to be decreasing seasonally. In January – February season the rainfall decreases by 0.5 mm annually. In March, April and May rainfall season, the rainfall was decreasing at the rate of 0.25 mm annually. In June, July, August and September, the trend is the same as rainfall was decreasing at the rate of 0.02 mm annually. Only October, November and December season that showed an increase of rainfall at the rate of 0.2 mm annually. If Dagoretti corner Station was taken as a representation of the ARCA, then it can be deduced that the rainfall within the Catchment decreases by a small margin annually.

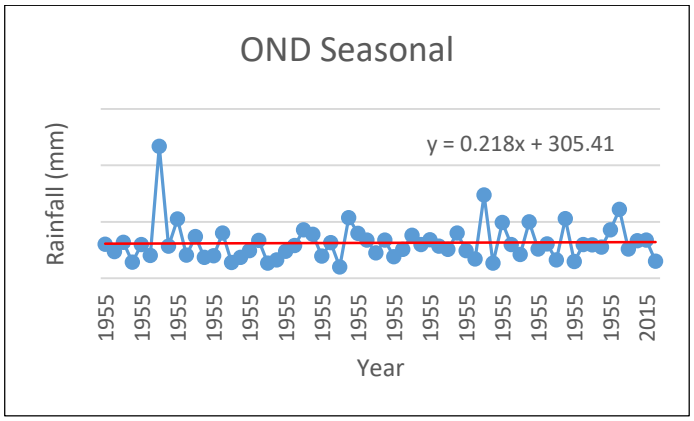












In conclusion it can be deduced that rainfall decreases with time in the ARCA and this will greatly affect the water availability within the region.

Temperature Time series for Machakos Meteorological Station

Since 1960, Kenya's mean annual temperature has increased by 1.0°C, at an average rate of 0.21°C per decade. The rate of increase has been most rapid in March-May (0.29°C per decade) and slowest in June-September (0.19°C per decade). This is evidently shown by Machakos Meteorological station as shown below where temperature data was analysed for a period of 37 years between 1978 and 2015. The temperature trend for Machakos station shows an increase in temperature at the rate of 0.00008 ^{o}C per day which reflects to 0.0292 ^{o}C per year. This further shows that there has been an increase of 0.292 ^{o}C per decade.

Machakos Meteorological Station