Effects of Climate and Land Cover Changes on Habitat for Herbivores at Mole National Park, Ghana

K. B. Dakwa

Department of Conservation Biology and Entomology, School of Biological Sciences, University of Cape Coast, Ghana

Corresponding Author: dkb92@yahoo.com, kdakwa@ucc.edu.gh

Abstract

The aim of this study was to determine climate and land cover changes in the MNP and the effect these could have on the large herbivores. Monthly temperature and rainfall data and Landsat satellite imagery from 1980 to 2013 for the Mole National Park (MNP) were acquired. Land cover classes of the imageries were validated through ground truth accuracy assessment procedure. Autoregressive integrated moving average (ARIMA) model was used to model the data using time series statistics with R. The results indicated a rise in temperature that became significant after two decades and a reduction in the amount of rainfall every decade. The decade mean temperature for the period 2000–2010 (2000s) reached the highest of 27.2 ± 0.15 °C while the 1980s recorded the least of 26.7 ± 0.25 °C. The decade mean rainfall for the 1980s reached the highest of 129 ± 9.91 mm while the least of 93.9 ± 7.41 mm was recorded in the 2000s. There was a strong and significant negative correlation between the mean rainfall time series and the mean temperature time series for the period under review. The shrub-land occupied the largest part of the Park (about 26%) followed by the open savanna (23%). Rainfall influenced the open savanna, grass and shrub classes immediately, but the closed savanna lagged behind rainfall by five years. As forecast suggested a relatively high temperature and low rainfall, the shrub-land and grassland are likely to shrink while open and closed savanna woodland areas expand by 2020. Accordingly, there may be shrinking forage resources for the grazers and abundant forage for the browsers during the period. It is recommended to reduce the extent of burning at MNP during the forecast period to make forage sufficiently available for grazing. Regular follow up to this study could provide a guideline to securing habitats, and forage, for MNP’s herbivores.