

**Land-Use/land Cover Change and Its Relationship to Changing Climate and Crop  
Production in the Lower Volta Basin, Ghana.**

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**ABSTRACT**

The construction of the Akosombo and Kpong dams have led to a change in the watershed ecology which has in turn contributed to the change in land use and land cover of the Lower Volta Basin (LVB). Inevitable changing global climate has also played a role in the alteration of land cover and crop production which have affected livelihoods. In this study, a post-classification comparison change detection algorithm was used to determine changes in land use and land cover that have taken place from 2003-2015. A statistical analysis of rainfall and temperature variability for a period of five decades was studied as well as the perceptions and knowledge of farmers on climate change and land use/cover modification. The Diva GIS program was used to model and generate maps of crop suitability for current and projected future climatic conditions. The LUCC maps showed that between 2003 and 2015, the amount of mixed savannah vegetation, forest vegetation, grass lands and water decreased from 14.8% to 9.9, 35.1 to 32.3%, 3.6 to 3.2% and 6.1 % to 4.3%, respectively of the total area, while farmlands (agriculture) and built up areas increased from 14.8% to 29.8% and 4.2% to 5.4%, respectively. The grasslands vegetation cover remains the largest and dominant land cover type and agricultural land use is second and increasing at a very fast pace. The small-scale shifting cultivation agriculture practiced in the LVB is the main factor responsible for the conversion of savannah and grassland vegetation into cropland. The changes in land cover is however a

continuum which is influenced by changing climate. An increase trend in temperature and a decrease in rainfall have been identified with the Lower Volta Basin over the past five decades. These actual observed trends of rainfall and temperature affect crop yield in the area. However an increase in cropped area, application of fertilizer and the use of drought resistant seeds increases the general production of crops in the area.

Developed cropped suitability maps of the Lower Volta Basin, show that projected future climatic conditions will affect crop production and thus adaptation measures required.

## **SUPERVISORS**

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