Modelling Forest Fire Risk in the Goaso Forest Area of Ghana: Remote Sensing and Geographic Information Systems Approach

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Abstract : Forest fire, which is, an uncontrolled fire occurring in nature has become a major concern for the Forestry Commission of Ghana (FCG). The forest fires in Ghana usually result in massive destruction and take a long time for the firefighting crews to gain control over the situation. In order to assess the effect of forest fire at local scale, it is important to consider the role fire plays in vegetation composition, biodiversity, soil erosion, and the hydrological cycle. The occurrence, frequency and behaviour of forest fires vary over time and space, primarily as a result of the complicated influences of changes in land use, vegetation composition, fire suppression efforts, and other indigenous factors. One of the forest zones in Ghana with a high level of vegetation stress is the Goaso forest area. The area has experienced changes in its traditional land use such as hunting, charcoal production, inefficient logging practices and rural abandonment patterns. These factors which were identified as major causes of forest fire, have recently modified the incidence of fire in the Goaso area. In spite of the incidence of forest fires in the Goaso forest area, most of the forest services do not provide a cartographic representation of the burned areas. This has resulted in significant amount of information being required by the firefighting unit of the FCG to understand fire risk factors and its spatial effects. This study uses Remote Sensing and Geographic Information System techniques to develop a fire risk hazard model using the Goaso Forest Area (GFA) as a case study. From the results of the study, natural forest, agricultural lands and plantation cover types were identified as the major fuel contributing loads. However, water bodies, roads and settlements were identified as minor fuel contributing loads. Based on the major and minor fuel contributing loads, a forest fire risk hazard model with a reasonable accuracy has been developed for the GFA to assist decision making.

Keywords : forest, GIS, remote sensing, Goaso

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