



The Human Ecology and Geography of Burning in an Unstable Savanna Environment

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According to new ecological theories, many savannas are inherently in disequilibrium and can flip from tree-dominated to grass-dominated landscapes depending upon the disturbance regime. In particular, a shift in a fire regime to a more frequent and intensive one can radically alter the tree-to-grass ratio in a given savanna. Drawing upon the ecological buffering model we argue that savanna persistence requires a relatively stable fire regime. We hypothesize that anthropogenic burning practices perform this function by producing a regular annual spatiotemporal pattern of fire that is linked to vegetation type. We test this hypothesis using a study of two areas, one in Mali and the other Burkina Faso. We use two sources of satellite data to produce an 11-year time series of the spatiotemporal pattern of fires and an example of the annual burned area pattern these fires produce. We combine the analysis of satellite imagery with interviews of rural inhabitants who set fires to understand the logic underlying the patterns of fire. Analysis of a time series of imagery reveals a strikingly regular annual spatiotemporal pattern of burning for both study areas, which cannot be explained by the regional climatic pattern alone. We conclude that the regularity of the annual fire regime in West Africa is a human-ecological phenomenon closely linked to vegetation type and controlled by people's burning practices. We argue that the anthropogenic burning regime serves to buffer the savanna and maintain its ecological stability.

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