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NIGERIA

Fire Situation in Nigeria

Introduction

Nigeria is situated in West Africa (the coordinates of the center of the country are 10°00' N, 8°00' E) with a total area of 923,768 622 km², of which 910,768 km² is land (Figure 1). With a total population of more than 130 million inhabitants Nigeria is the most populous country south of the Sahara. The land use pattern of the land area is about 33% arable land, 44% permanent pasture, 12% forest and woodland, 3% permanent crops and 8% for other land use patterns. Cocoa, other cash crops, timber, grasses and other useful and non-useful vegetation are destroyed annually in Nigeria by wild fires. However quantified estimates of losses due to wildfires are not presently available.

Figure 1. Map of West and Central Africa showing the location of Nigeria. Source: Globalis.

Climate and fire regimes

Nigeria is composed of various ecotypes and climatic zones, from the Sahel savanna in the north to the mangrove swamps in the south, and their associated semi-arid and humid climates (Figure 2). Over Nigeria, indeed the whole of West Africa, rainfall is of two regimes: a bi-modal maximum south of 10°N and a single maximum north of this latitude. This distribution is partly a result of the seasonal oscillation of the Intertropical Convergence Zone (ITCZ), (or Intertropical Discontinuity - ITD) (Omotosho, 1985).

In the dry season, wildfires are a constant threat to the savanna bushland and forest ecotypes in Nigeria. During this period, the soil become perched, the vegetation desiccated, and the forest and savanna ecotypes, therefore become ready fuel waiting for the crucial ignition to flare up. Figure 2 shows the spatial and temporal variations in the ecozones of Nigeria over a 42-year period (Geomatics, 2000). Notice the southward shift trend of the boundaries of the more arid ecozones and the conversion of the lowland rain forest to derived savanna. This shift apart from other anthropogenic activities is also partly a result of seasonal uncontrolled wildfires. Increased wildfire hazard is

associated with high temperature, low humidity, high fuel loads and variable *Harmattan* winds (Balogun et al., 2004).

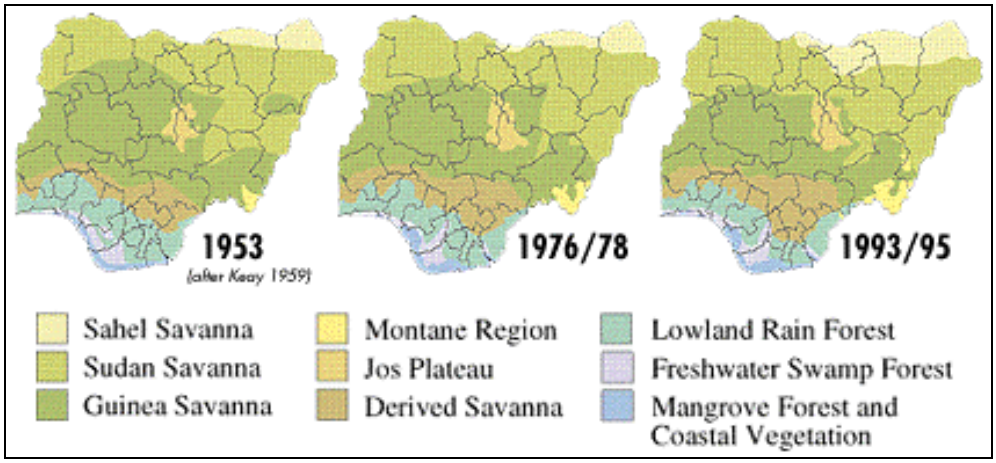

Figure 2. Changes of the ecozones of Nigeria over 42 years (source: © Geomatics Nigeria Limited, 2000)

Wildfire impacts

In every part of Nigeria, burning represents a useful cultural tradition that cannot be done away with. Fire is used as a work tool generally by rural populations, fires serve for land clearing for agricultural purposes, disposal of wastes, pasture management for livestock, honey gathering and animal tracking and hunting. These practices are common in most countries in West Africa covered by dry forests, or savannah from Guinea to Nigeria. The majority of wildfires in Nigeria is caused by human activities and lightening fires are very rare because these occur mainly in the rainy season. The majority of damaging fires are observed from January onwards, due to the high temperatures during this period (above 35°C) and also to the influence of the hot and dry *Harmattan* winds flowing from North to South between December and March. However, the importance of fire varies from one zone to another. Therefore, the area situated above latitude10°N in Nigeria experience more wildfires, mainly because this is the savanna ecozones with a shorter duration of rainfall and a longer period of dryness.

Fire Database

There are no forest fire statistics allowing for an analysis of the causes, risks and extent of damage. However, there are little general information on the occurrence and season of fires that could reveal information concerning the timing of forest fires. These few sources included the National and state fire services, the National and state forestry and wildlife services, Interested NGO's like farmers unions and educational institutions like Colleges and Universities. Fire statistics are not yet compiled or aggregated at the national level, and resources for obtaining fire statistics in the field are limited. Analysis of the few available fire information for the period 1992 to 2000 from various sources for the forest and savanna ecozones in Nigeria gave some insight into the understanding of fire activity in Nigeria (Balogun et al., 2004). Important findings are briefly discussed below.

The fire season is October-April in the savanna ecotype, while it is from November-March in the forest ecotype. January was observed to be the month of peak fire incidence in the two ecotypes in Nigeria (Figure 3). The study also established 3 fire-risk day categories (High, medium and low), based on meteorological variables (air temperature, relative humidity and wind speed and direction), under no precipitation conditions for both ecotypes. The scheme can serve as a crude fire danger warning system in the two ecotypes. The efficiency of the scheme will be greatly enhanced when more meteorological and ecological information (meteorological data, fire occurrence inventory, stage of vegetation, soil moisture, forest litter, fuel moisture content, etc) are readily available.

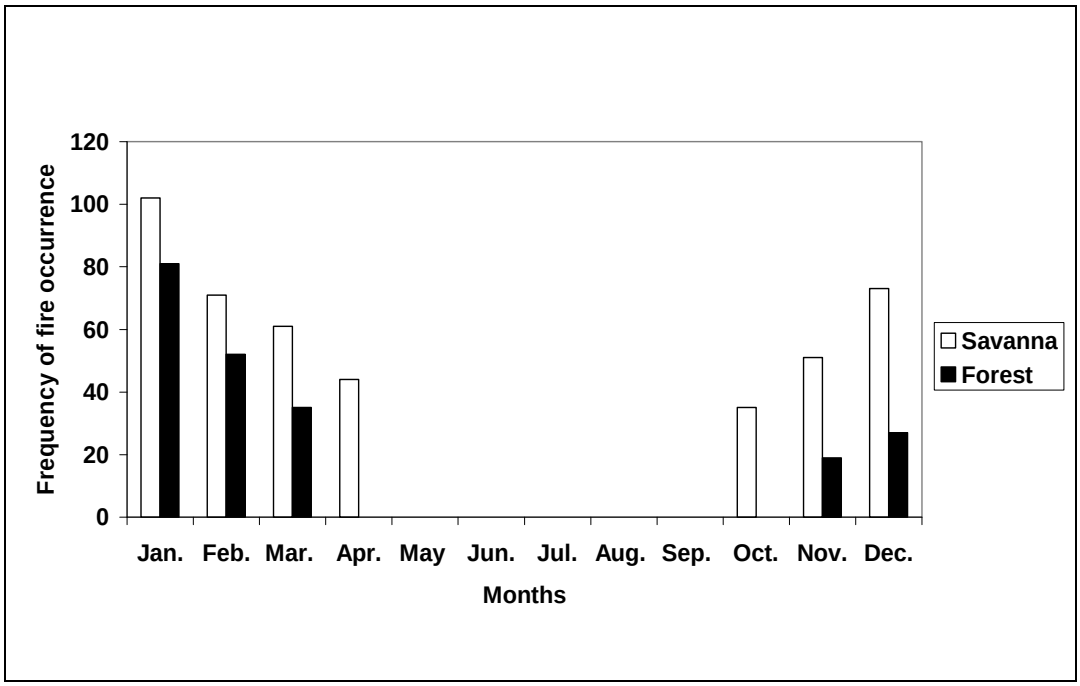

Figure 3. Frequency of seasonal fire occurrence in the Nigerian forest and savanna ecosystems.

Operational fire management systems

Fire prevention, Suppression and fighting

Fire fighting units only exist in urban city centres to control fires in urban areas to the detriment of fire management in rural areas, forest and Wildlife reserves. However attempts to manage fires are made in all the federal and state forest reserves and wildlife parks, under the Federal Department of Forestry and the Ministry of Environment, but efforts are limited by the lack of adequate facilities and well-trained fire personnel. Fire suppression and prevention facilities are either non-existent, not functioning or obsolete and fire breaks and towers are not well maintained. Fire fighting is done on a spontaneous and ad-hoc basis, as there are no proper routine and methodological preparations and guidelines for fire fighting in the reserves during the fire seasons. Local community mobilization and participation in fire fighting is non-existent, but farmers' associations are concerned with fire suppression, although links to government agencies have not yet been established.

Fire early warning, detection and monitoring

Presently there are no operational fire early warning, detection and monitoring systems in Nigeria. However, Balogun et al. (2004) proposed a simple scheme that may be used as an early warning scheme, while the recent launch of the Nigeria Sat-1 into orbit on 27th September 2003 may encourage government to establish an agency devoted to early warning, detection and monitoring of fires using remote sensing; the Nigerian satellite is a component of the Disaster Monitoring Constellation (DMC) incorporating Britain, Algeria, China and Thailand. The satellite among others is expected to monitor water resources, soil erosion, forest fires, deforestation and desertification and environmental disasters.

Fire Research

In Nigeria, research has developed a simple scheme that can be used as a warning scheme as well as a technique for assessing range condition for the suitability of carrying out control or prescribed burning in the forest and savanna ecozones (Balogun et al., 2004), this scheme presently uses only meteorological variables. The efficiency of the scheme will be greatly enhanced when more meteorological and ecological information (meteorological data, fire occurrence inventory, stage of vegetation, soil moisture, forest litter, fuel moisture content, etc) are readily available.

Earlier fire researches in Nigeria have centred on the management, roles and impacts of fire in the ecosystem development (Udo, 1990; Afolayan and Agbelusi, 1995; Oguntala, 1995 and Badejo, 2002). However, a major limitation to fire and forest resources management in Nigeria is the dearth of forest fire records, and the few that are available have not been properly documented. This realization motivated a study to develop a national wild land fire inventory and fire disaster management action plan for Nigeria, where a national fire inventory scheme was proposed and recommendations made towards achieving more effective monitoring and fire management planning through the use of currently available remotely sensed satellite products (Balogun, 2004). This study funded by the ProVention Consortium[1] was conducted under the umbrella of the Regional Subsahara Wildland Fire Network (AfriFireNet), the regional African arm of the Global Wildland Fire Network, which is facilitated by the Global Fire Monitoring Centre (GFMC), Freiburg, Germany. Research is also being conducted presently on the use of remote sensing for the monitoring and assessment of fire activities in Nigeria. Preliminary results of a comparison of TRMM / VIRS fire count products and observed fire occurrence data in the savannah and forest ecotypes in Nigeria show good agreement (Adegoke et al., 2005). Consideration is also presently being given to the comparison of fire counts and burn scar assessment using AVHRR, MODIS and Nigeria Sat1 satellite products. It is hoped that the success of this project will eventually provide the base for Nigeria's contribution of information and data to the Global Vegetation Fire Inventory (GVFI) and its successor arrangement, the Global Wildland Fire Assessment (GWFA), which aims globally among others to address the inadequacy of information on global emissions from free burning vegetation fires (wildfires, fires in land-use) and other plant biomass (burning of fuel wood and charcoal). Presently GVFI / GWFA does not get data from Nigeria.

Public policies concerning fire

Nigeria presently does not have national regulation (laws) and policy (guidelines) on the use and control of forest and wild land fires, but a brief mention was made in the Forestry Act Cap 40 of 1970. However formulation efforts are currently ongoing. As at January 2005 the draft bill of the national forestry act 2003 and the draft national forest policy 2003 have only been endorsed by the National Council on Environment. Both the policy and act, we are informed recognises many of the complexities of fire, including; the need to reduce the occurrence and severity of uncontrolled and accidental forest fire, while still allowing controlled fire under specific circumstances; that community participation is desirable in the protection of forest resources. They also contain substantial provision for the prevention, control and management of wild fires nationwide and the setting up of forest fire units at all tiers of government. The bill and policy are currently being processed for approval by the Federal Executive Council and promulgation by the National Assembly.

Since there are presently no functional regulations and policies, government policies are persuasion rather than enforcement in the electronic media. Television and radio campaigns, warning on the risks and danger of fire during the dry season are made by most states. At present, the lack of a database on the occurrence and impact of fires is the major obstacle to the development of an effective national policy. The current initiative to develop an inventory scheme to document the occurrence of fires is an important step in this direction.

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