DEVELOPMENT OF A NATIONAL WILDLAND FIRE INVENTORY AND FIRE DISASTER MANAGEMENT ACTION PLAN FOR NIGERIA.

FINAL REPORT

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By

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Ahmed Adedoyin Balogun (2004)

Summary

One major handicap to wildland and forest fire management in Nigeria is the dearth of forest fire records which should highlight the location of the incident, time and day of occurrence, cause, species affected, extent of damage to vegetation or crops and losses in financial terms among others. And the few that are available have not been properly documented. This project highlights the need and methodology for a functional and sustainable fire inventory and fire disaster management plan in Nigeria. The project proposes a functional structure for fire inventorization and fire disaster management, which hitherto are non-existent in Nigeria, starting with the establishment of structures for proper fire occurrence documentation at the district (community), local government, state and federal levels. The project also identified socio-economic and institutional barriers to the adoption of effective fire risk reduction strategies in Nigeria and recommended solutions to these barriers. The recognition that community-based natural resource management through community participation in the management and utilization of forest resources is an important strategy to address environmental degradation and particularly the widespread fire problems calls for its adoption in Nigeria. Embracing this approach in Nigeria is likely to contribute immensely to the reduction in the incidence of wild land forest fires.

Chapter 1

1. Introduction

1.1 Background and Rationale

Wildland fires are a widespread seasonal phenomenon in Nigeria and many parts of Africa and millions of hectares of forests and savannahs burn annually. Fires can be initiated both by lightning and humans, however in Nigeria, fires are mainly caused by human intervention and its frequency is rapidly increasing. Nomadic cattle herdsmen use fire to stimulate grass growth for livestock, while subsistence farmers use fire to remove unwanted biomass while clearing agricultural lands, and to eliminate unused agricultural residues after harvest. In most African ecosystems fire is a natural and beneficial disturbance of vegetation structure and composition, and in nutrient recycling and distribution. Nevertheless, substantial unwarranted and uncontrolled burning does occur across Africa, with attendant disastrous consequences. Effective actions to limit these are therefore necessary to protect life, property, and fire-sensitive natural resources, and also to reduce the current burden of emissions on the atmosphere with subsequent adverse effects on the global climate system and human health. Although estimates of the total economic damage of fires in Nigeria are not available, ecologically and economically important fires crossing borders from fire-adapted to fire-sensitive ecosystems are increasingly destroying forest resources.

1.2 Project Objectives

The overall objective of the project is to establish an effective and functional national wildland fire inventory and also design wildland fire management action plan that will enhance a sustainable wildland and forest fire disaster control and risk reduction in Nigeria.

The specific objectives are to:

1. Establish functional and sustainable wildland fire inventory structures at the local (community), state and federal levels.
2. Identify the socio-economic, institutional and political barriers at the various levels to the adoption of effective fire risk reduction strategies in Nigeria.
3. Recommend measures to overcome these socio-economic, institutional and political barriers at the various levels.
4. Design a functional and sustainable wildland fire disaster management action plan.
5. Co-opt the effective participation and co-operation of all stakeholders: communities, NGOs (Forestry Association of Nigeria and researchers in forestry and environment) forestry project

centres, state forestry and fire services, the Federal Department of forestry and fire services and other government agencies with related mandate in agriculture, forestry, environment and disaster mitigation in the adoption of effective fire risk reduction strategies in Nigeria.

6. Organise a workshop/conference to heighten the awareness of stakeholders to the threat of natural disasters, and what can be done about them, and also increase the understanding of policy makers, decision-makers and practitioners about fire disaster management.
7. Provide the base for a continuous contribution of information and data to the Global Vegetation Fire Inventory (GVFI), of the Global Fire Monitoring Centre (GFMC), Freiburg, Germany.

1.3 Justification

In Nigeria, presently, annual damage due to wildland and forest fires are enormous, yet, there are no concrete provisions for wildland fire management and control in the Nigerian forest and savannah agroecosystems as efforts are still at the formulation stage. One major handicap in fire and forest management in Nigeria is the dearth of forest fire records which should highlight the location of the incident, time and day of occurrence, cause, species affected, extent of damage to vegetation or crops and losses in financial terms among others (Udo, 1990). And the few that are available have not been properly documented. This lack of proper forest fire records has limited efforts at developing effective strategies to mitigate and control the adverse effect of uncontrolled forest fires in Nigeria (Balogun, 2002).

There is now a global concern for the documentation of forest fires co-ordinated by the establishment of the Global Fire Monitoring Centre (GFMC) through the establishment of the Global Vegetation Fire Inventory (GVFI). This effort is supported by the Economic Commission for Europe (ECE), Food and Agricultural Organisation (FAO) and the UN International Strategy for Disaster Reduction (UN-ISDR) among others. Nigeria is not presently participating in this programme, this informed on the need to establish a functional wildland Fire Inventory and Management Action Plan for Nigeria. See appendix 2 for the global vegetation fire inventory summary for 1998 and 2002 with no data from Nigeria. There is an urgent need for a concerted, integrated and co-ordinated programme for a sustainable wildland fire disaster risk reduction and ecosystem management in Nigeria.

Chapter 2

2.0 Methodological approach

2.1 Area of Study

Nigeria can been classified into 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, fire hardly enters the mangrove swamps except when there are petrol pipe leaks, bursts or vandalization, leading to extensive damage to life and property in the Niger Delta mangrove swamps.

From the thirty-six (36) states of Nigeria, the following twenty-one (21) states were selected for the wildland fire occurrence documentation:

- Rain forest: Ondo, Oyo, Osun, Ogun and Edo
- Guinea savanna: Kwara, Kogi, Benue, Taraba and Plateau
- Sudan savanna: Niger, Adamawa, Kaduna, Kebbi and Bauchi
- Sahel savanna: Sokoto, Kano, katsina, Jigawa, Yobe and Borno

The states were selected according to the broader criteria established for the major ecotypes in Nigeria.

2.2 Project Implementation

The project implementation activities were executed at three stages.

2.2.1 Stage 1

In the first stage, visits were made to State and Federal Departments of Forestry, State Game Reserves, National Wildlife Parks, Local Government Headquarters and state fire services. The visits were for three main reasons:

(a) To obtain information regarding the existence of fire records or structures for the documentation of forest fire occurrences, regulations and programmes concerning prevention, suppression, control and management activities, identify the socio-economic, institutional and political barriers at the various levels of government to the adoption of effective fire disaster and risk reduction strategies in Nigeria. And also to collate all information about community/stakeholder based forest fire management. The outline of the information sought is in appendix 3.

(b) To sensitise the various stakeholders on the need for the proper documentation of fire occurrences in their various ecozones and make active an existing passive structure for the proper documentation of forest fires in Nigeria, see appendix 4.

(c) To train all concerned on how to keep proper fire records in a form that is acceptable for international exchange and particularly to the Global Vegetation Fire Inventory (GVFI) of the

Global Fire Monitoring Centre (GFMC), University of Freiburg, Freiburg, Germany. Using the GVFI form and its modified versions, see appendix 5.

2.2.2 Stage 2

The second stage of this project was to involve participation in conferences relevant to the project and the organising of a one-day workshop to heighten the awareness of stakeholders to the threat of wildland fire disasters and what can be done about them.

2.2.3 Stage 3

The third stage took place in the Federal Capital Territory Abuja (the sit of government) at the Federal Departments of Forestry, National Wildlife Parks Headquarters and the Federal Ministry of Environment, which involved series of meetings. The purpose of the visits to the three establishments are also threefold.

(a) To sensitise the Honourable Minister of Environment, Director of Forestry and the Conservator General of National Parks at the federal level on the need for effective, integrated and co-ordinated fire data inventory in Nigeria.

(b) To train an officer in each of the Departments on how to collate fire records from the various states in a form that will be acceptable to the Global Vegetation Fire Inventory (GVFI) of the Global Fire Monitoring Centre (GFMC), University of Freiburg, Freiburg, Germany. The officer so trained will be responsible for the continuous contribution of information and fire data to the GVFI.

(c) To solicit for an official directive to all Federal and State Departments of Forestry, State Game Reserves, National wildlife Parks, State Ministries of Environment and Local Governments to commence immediately, fire data documentation as part of their routine schedule.

Chapter 3

3.0 Results and Discussion

Stage 1

Results from stage 1 implementation of the project reveals that there are no wildland and forest fire records in Nigeria and the few that are available have not been properly documented, lacking vital information. Fire fighting units only exist in urban city centres to control fires in urban areas with no capacity and facilities to fight wildland fires to the detriment of fire management in rural areas and forest reserves. Results also show that there is no integrated structure for the documentation of forest fires in the country. However a passive structure exists that has been suggested for activation for use in this regard, see appendix 4. Since independence, military dictators and democratic governments have ruled Nigeria. During military regimes, the constitution is suspended and the issuance of decrees and edicts at the federal and state levels are used to achieve legislation respectively. Results from this study reveals that Nigeria presently does not have a national regulation (laws) and policy (guidelines) on the use and control of forest and wildland fires and efforts in this direction are still at the formulation (draft) stage, but brief mention was made in the Forestry Act Cap 40 of 1970 of the laws of Nigeria. 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 contain substantial provision for the prevention, control and management of forest and wildland 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.

Investigations also reveals that some states in Nigeria do have regulations (Edicts) governing the use and control of fire, an example is the Ondo state “Control of bush burning edict, 1989”. Though these are seldom enforced because of difficulties in arresting and bringing to book those responsible. Awareness programmes are limited to radio and television jingles on the need fore care with the use of fires during the dry season by the ministry of agriculture and natural resources, again this hardly get beyond the urban city centres to the rural communities that are most concerned. Results also show that most forestry and wildlife management agencies in the country lack the basic infrastructure to detect, prevent and suppress fires, and for those that have, this capability is rapidly breaking down and becoming obsolete. Only wildlife and forest reserves managed by the federal government and private institutions enjoy some level of proper management and protection. While those managed by the state governments are in a terrible state of neglect and are at the mercy of encroachers and poachers.

Observation show that the states mostly concentrate on strategies to get revenue from the forests without ploughing same back to the sustainable management, development and protection of these reserves. Results further show that fire control is greatly complicated by the fact that unwarranted and uncontrolled fires occur as widely dispersed small events, which to policy makers may not yet be sufficiently important to warrant national concern. Results also reveal that the rapidly increasing population growth, lack of economic development and alternative employment opportunities to subsistence agriculture, hunting and over dependence on forest resources in the rural communities has lead to increased human pressure on the land and forest resources. This also has lead to widespread land transformation resulting in increased grass production, which in turn encourages intense dry season fires that suppress tree regeneration and increase tree mortality. And finally budgetary constraints on the government have basically lead to the prevailing lack of financial, infrastructure and equipment resources for fire management in Nigeria. These goes along with a lack of human resources adequately trained in the field of wildland and forest fire management**.** These results can be summarised as the identified Barriers to effective fire disaster and risk reduction strategies in Nigeria (section 3.1).

Stage 2

Attending and participating fully in three major conferences relevant to the project executed stage 2 of the project implementation;

1. The 29th Annual Conference of the Forestry Association of Nigeria, 6th – 10th October 2003, Calabar.
2. The 11th Annual Conference of the Environment and Behaviour Association of Nigeria, 26th – 27th November 2003, Akure, Nigeria.
3. 3rd meeting of the National Council on Environment, Federal Ministry of Environment, 1st – 5th December 2003, Ilorin, Nigeria.

The one day workshop to heighten the awareness of stakeholders to the threat of forest fires and what can be done to control them was initially planned as part of the activities for stage 2 of the project implementation. But, this could not be executed for time, logistics and financial constraints. However, participation in the three conferences above contributed immensely to heightening the awareness of stakeholders to the threat of forest fires and what can be done to control them as most of the target participants for the workshop were present at these conferences.

Stage 3

The outcome of the execution of stage 3 of the project implementation was very encouraging as all the establishments visited responded favourably to the project objectives as they were in line with government thinking. Relevant information on the state of national forest fire protection and legislation in Nigeria, and government efforts in this direction were provided.

We could not reach the Honourable Minister of Environment due to official engagements abroad, however, we met the permanent secretary in the ministry who informed that our earlier correspondence has been acted upon by the Honourable Minister and forwarded to the Director of Forestry. He then advised that we work closely with the Director of Forestry. Incidentally we had met with the Director of Forestry earlier on the subject matter, this made our subsequent meetings with him very successful. The Federal Department of Forestry had acted on all our correspondence and deliberations and appointed an Assistant Director to liaise with us on government efforts and how to actualize our proposal. Here we were informed that the national forest fire protection and legislation are still at the draft stage, as 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 contain substantial provision for the prevention, control and management of forest and wildland fires nationwide. Our proposal on wildland fire inventorization is presently being studied by the Federal Department of Forestry to see the feasibility of its implementation before official directives could be issued to all Federal and State Departments of Forestry, State Game Reserves, National wildlife Parks, State Ministries of Environment and Local Governments to commence immediately, fire data documentation as part of their routine schedule. Our meeting with the Conservator General of National Parks at the federal level was also very fruitful. He assured that the national wildlife parks would be directed to commence immediately, fire data documentation as part of their routine schedule, while waiting for the national directive from by the Federal Department of Forestry.

3.1 Barriers to effective fire disaster and risk reduction strategies in Nigeria

The barriers at the various levels of government to the adoption of effective fire disaster and risk reduction strategies in Nigeria were identified under two broad headings, these are the socio-economic and the institutional and political barriers. Their implications for wildland fire control and management in Nigeria are discussed**.**

3.2 Socio-economic barriers

- High poverty level and low level of social status
- Low level of employment
- High and increasing population density
- Low level of literacy and high level of illiteracy in the rural communities
- Traditional controls on burning in customary lands and the primitive system of crop and animal husbandry are now largely ineffective

3.3 Political and Institutional barriers

- Lack of appropriate regulations and enforcement relating to wildland vegetation fires
- Lack of adequate education and training, incentives and or motivation and adequate remuneration for the staff of the agencies responsible for monitoring and containing forest fires.
- Lack of adequate education and training, awareness, incentives and or motivation for rural communities who are responsible for most of these fires, on the need and benefits of using fires in a rational and controlled manner.
- Lack of appropriate and adequate fire prevention, suppression, control and management programmes at the three tiers of government.
- Lack of community/stakeholder participation based forest fire management programmes
- Lack of concerted, integrated and co-ordinated programme of forest fire management by the various agencies saddled with this responsibility at the three tiers of government.
- Lack of adequate financial resources to put in place adequate logistics for monitoring, prevention, suppression, control and management of wildland and forest fires (Fire towers, fire breaks and traces, awareness programmes, communication, roads and transportation, equipment, security etc).
- Lack of manpower adequately trained and skilled in the art of control and management of wildland and forest fires.

Chapter 4

4.0 Wildland Fire Disaster Management Action Plan For Nigeria

4.1 Introduction

The economic loss suffered in Nigeria from Fire disasters by several economic sectors including air, water, construction, tourism, forestry and agriculture is enormous and yet to be fully quantified. In light of the current trend of destruction by wildland fires, there is need for concrete plans which should set out co-operative measures needed to address the problems arising from wildland fires in Nigeria. The National Fire Plan should be a long-term investment that will help protect communities and natural resources, and most importantly, the lives and property. It will be a long-term commitment based on co-operation and communication among federal agencies, states, local governments, tribes and interest groups.

4.2 Objectives

The primary objectives of this plan are:

(a) To control and prevent wildland fires through better management policies, including community participation and enforcement.

(b) To establish operational mechanisms to monitor land and forest fires; and

(c) To establish and strengthen national land and forest fire fighting mechanisms and other mitigating measures.

4.2.1 Preventive measures

In Nigeria there is the need to strengthen national policies and strategies to prevent and mitigate land and forest fires. The national plans should contain the following elements:

(a) Policies to curb activities that may lead to land and forest fires, including the prohibition of open burning and the strict control of slash-and-burn practices during the dry season (fire season).

(b) Strategies to curb activities that may lead to land and forest fires including the following:

- Formulation of environmental quality management legislation to prohibit open burning;
- Strict enforcement of laws and legislation;
- Provision of incentives for compliance;
- Establishment of national task force/committee to develop strategies and response plans to deal with fires and smoke; and

- Utilization of information technology to provide information to relevant agencies to prevent and control the spread of fire and to enhance public awareness on the risk associated with wildland fire.

(c) Guidelines and support services to discourage activities, which can lead to land and forest fires.

(d) Operating procedures for the early mobilisation of resources to prevent and control the spread of fire.

(e) Initiation and encouragement of community-based natural resource management programmes (through the establishment of community forestry programmes), with provisions for fire management through proper infrastructure development and community participation.

4.2.2 National monitoring mechanism

The plan will include the establishment a national early warning and monitoring system to provide an alert of the first outbreak of land and forest fires, an assessment of meteorological conditions, a systematic tracking of the initiation and spread of fires, and the necessary data to support enforcement action. As part of this effort, existing meteorological stations should be enhanced and strengthened while new ones should be established to cater for fire weather forecasting needs. The specialised meteorological stations will serve as a national information centre for compiling, analysing and disseminating information derived from satellite imageries and meteorological data necessary for fire danger forecasts, to detect and monitor land and forest fires.

4.2.3 Fire fighting capabilities

The plan will also include the establishment of national land and forest fire fighting units and the strengthening of existing fire service units through the following measures:

(a) Preparation of the inventory of the fire-fighting capabilities of the country (agencies, manpower, equipment, etc) to provide a framework for the establishment of the proposed land and forest fire-fighting units.

(b) Formulate a programme to strengthen the fire-fighting capability of individual states and the nation and compile a list of equipment that is needed at the national level to tackle land and forest fire;

(c) Identify the sources of technical assistance for (b) within and outside Nigeria and if required formalise assistance programme with international support agencies. Technical assistance may include fire-fighting equipment, training and capacity building.

(f) Establish a mechanism in the country to provide, in the event of an outbreak of wildland fires, regular updates to the fire technical task force on progress made in efforts to fight the fires. The updates should include the number of hot spots and their locations, analysis of fire types, problems encountered, adequacy of deployed resources and effectiveness of resources and ground operations.

Chapter 5

5.0 Conclusion and Recommendation

It was evident from this study that the losses from wildland fires in Nigeria are enormous, though there are no official figures. However, in spite of the frequent occurrence of wildland fires in Nigeria, there was no proper documentation of the fire events at all tiers of government. Also, there was little or no integrated and coordinated effort towards fire monitoring, prevention, suppression and control among the stakeholders. As a first step towards addressing forest fire management problems in Nigeria, the study has successfully sensitised the major stakeholders on the need for and benefits of establishing a national wildland and forest fire inventory in Nigeria. A proposal on how the fire inventory can be achieved has also been suggested. The study also identified various socio-economic and institutional barriers to effective fire disaster and risk reduction in Nigeria. A wildland fire disaster management action plan has also been designed for Nigeria. Based on the various identified socio-economic, and institutional barriers to effective fire disaster and risk reduction in Nigeria The following are therefore recommended to enhance effective fire disaster management and risk reduction in Nigeria:

1. There is an urgent need for the government to put in place programmes that will provide alternative job opportunities to the traditional farming and hunting to increase the employment of the youth in the rural communities, thus reducing the poverty level. During the dry season in most parts of Nigeria, it is a cultural activity of the unemployed youths to go on group hunting parties, setting the vegetation on fire to drive their preys out of their habitats and make them easy targets.

2. The population density in Nigeria is becoming too high. There is low level of social status arising from high level of illiteracy and this is exerting too much pressure on land and forest resources. There is therefore an urgent need for government to intensify the programme on birth control and put in place a programme of effective education for all so as to increase the level of literacy in the country.

3. A very prominent source of forest and wildland fires in Nigeria is the traditional/primitive system of crop and animal husbandry. Slash and burn-shifting cultivation is still the dominant farming practice in most villages in Nigeria. During land preparation, fire remains a potent tool for ensuring a clear and clean land before planting. Although the burning is prescribed, it often gets out of the prescribed area. Similarly, the process of pastoral nomadism is also a major source of wildland vegetation fires involving a cycle of periodic movements of cattle; travelling in the dry

season from the north to the south in search of pasture and water and back again in the rainy season. The nomads set the vegetation on fire to initiate pasture regeneration for their livestock and these get out of hand. The government through the extension services of the Ministry of Agriculture should initiate programmes of sensitisation and education of the farmers on sustainable alternative and environmentally friendly farming practices to shifting cultivation (e.g. Agroforestry, Alley farming). Also programmes on pasture production and rangeland management to produce fodder for livestock, as alternatives to the traditional migratory pastoral nomadism should be initiated.

4. The government should put in place appropriate regulations relating to wildland vegetation fires and also establish an effective structure to enforce these regulations. However, the major challenge will be to create an enabling framework for effective and sustainable forest fire management. It is necessary to address the reasons for these fires; rather than only trying to increase the suppression capacity or by strict fire legislation. Newman (2002) argued sustainability embraces attacking the heart of how we make decisions. Proactive fire management approaches are needed to establish data on the underlying causes of these fires, only then is it possible to develop national strategies in the appropriate use of fire as a management tool.

5. There is need for land use maps in Nigeria, such maps will indicate the type, characteristics and quality of land in Nigeria. This will be important in delineating the different uses to which the land can be put. More effective planning could also be achieved through the use of currently available remotely sensed satellite products.

6. Government should be more committed in its efforts at preserving the environment, by adequately funding the agencies saddled with the responsibility of managing the environment, particularly as it pertains to forest resources and wildland fires. Also the gap between the decreasing fire management resources and the increasing fire problems in Nigeria due to lack of manpower adequately skilled in forest fire management need to be bridged with immediate response through training and capacity building.

7. Government should initiate and encourage community-based natural resource management programmes (through the establishment of community forestry), with provisions for fire management through proper infrastructure development and community participation. The recognition that environmental management at the local level is the appropriate scale at which to

address environmental degradation and particularly the widespread fire problems is fast gaining significance. Community-based natural resource management is now being increasingly implemented in many parts of Africa and Asia with very encouraging results (FAO, 2003; Olanrewaju, 2003). It is believed that communities will do everything within their means to protect their forests from degradation, particularly from forest fires, when the communities have a stake in the forest resources.

8. Government should after initiation of community-based natural resource management programmes, formally back-up the community forestry approach with the development and adoption of Forest Policies, with special emphasis on community involvement in forest resource management. This concept foresees local communities taking care of forest areas adjacent to their community forests and sharing the benefits obtained with the government.

9. The perception by policy makers that unwarranted and uncontrolled burning resulting in extensive wildfires occurs widely as localised dispersed small events that are not sufficiently important to warrant national concern must be challenged and corrected as a first step towards more deliberate, controlled and responsible use of fire in Nigeria.

10. National awareness raising on forest fire management should be made the responsibility of all stakeholders including the national network of local schools, health clinics, local communities, NGOs, local artists and all the people that make a living from forest resources rather than the exclusive responsibility of forestry and agriculture.

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APPENDIX 1

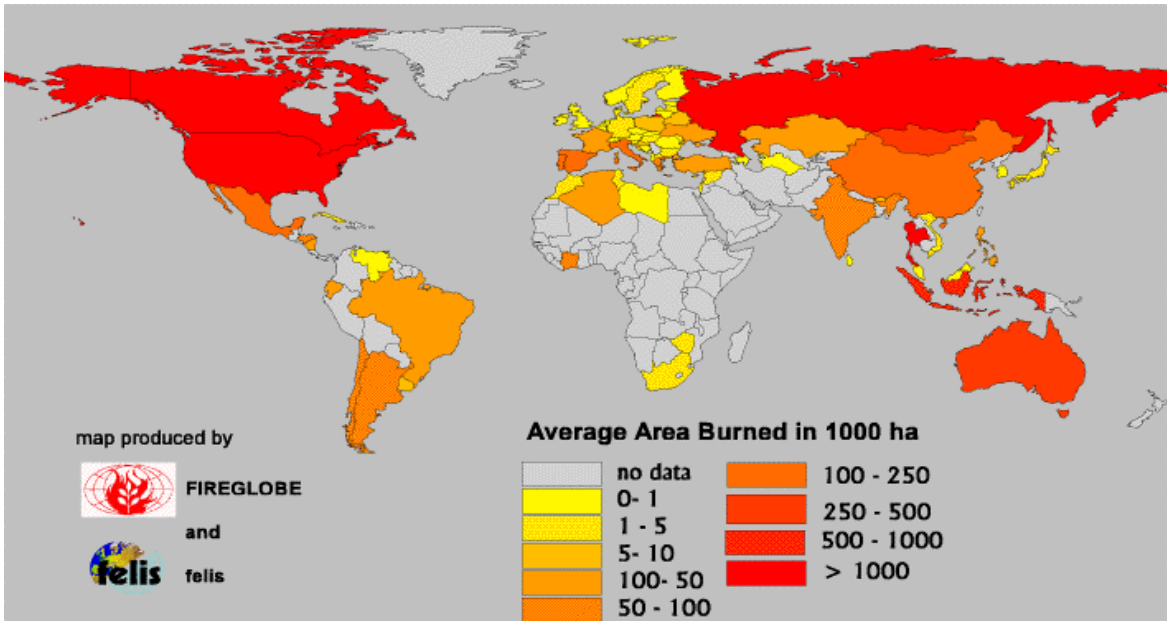
Lessons Learned from the study

- Properly documented data on vegetation fires is virtually non-existence in Nigeria even when it was evident that wildland fires create prominent problems in the country.
- Facilities for the monitoring, prevention, suppression and control of wildland fire exists only in federal government protected forest reserves and wildlife parks, even then most facilities are broken down and obsolete. The state government owned forest reserves and game reserves suffer from neglect even firebreaks are not maintained and there is virtually little or no forest fire-fighting programme in Nigeria.
- The lack of appropriate socio-economic and institutional structures at the three tiers of government have contributed major barriers to the development of effective fire disaster and risk reduction strategies in Nigeria.
- Presently, some form of legislation relating to wildland vegetation fires exists only at the state level, but at the federal level, they are subsumed under other natural resources regulations, and the difficulty in enforcement of these punitive and ill-defined regulations coupled with the lack of incentives have made them largely ineffective.
- Communities are not encouraged to partake in forest resources management because they perceive this responsibility to be that of the government since the government owns the land and forest resources and get revenue from them; Land use Act (Decree No. 6 of 1978).
- It is now becoming evident that community participation in the management and utilization of forest resources (through the establishment of community forestry) is an important strategy to reduce the incidence of forest fires, when communities have a stake in the forest resources, it is believed that they will do everything within their means to protect their forests from degradation activities, particularly forest fires (FAO, 2003). Embracing this approach in Nigeria is likely to contribute immensely to the reduction in the incidence of forest fires.
- The prevailing lack of financial, infrastructure and equipment resources for fire management in Nigeria coupled with the lack of human resources adequately trained in fire management warrant the active participation of Nigeria in the activities of the Regional sub-Saharan Fire Management Network (AfriFireNet). Through this Nigeria will be able to benefit from international assistance to bridge the gap between the decreasing fire management resources and the increasing fire problems in Nigeria through capacity building.
- There is a need for a follow–up study on the present effort that will monitor and evaluate the progresses and limitations and also facilitate the entrenchment of community based fire management strategy which is presently non-existent in Nigeria.

APPENDIX 2

Summary of the Global Vegetation Fire Inventory (GVFI)

Global Vegetation Fire Inventory (November 2002)



Source: http://www.fire.uni-freiburg.de/inventory/gvfi.htm

Remarks: The GVFI is continuously updated by the GFMC. The map on the website can be used to zoom into more detailed statistical data. A new version will be uploaded on the GFMC website by end of 2004.

APPENDIX 3

Outline of information gathered

1. Do you experience wildland/forest fire occurrences here?

2. When and how often do you experience wildland/forest fire occurrences here?

3. Do you have any record of the previous wildland/forest fire occurrences?

4. If no, what has prevented the proper documentation of fire occurrences, in spite of the existing structure to keeping such data?

5. What has been the nature of losses due to wildland and forest fire?

6. What are the barriers to the adoption of effective fire disaster and risk reduction strategies in Nigeria.

7. State policies, laws and regulations regarding
(a) Fire monitoring
(b) Fire prevention
(c) Fire suppression
(d) Fire management and control

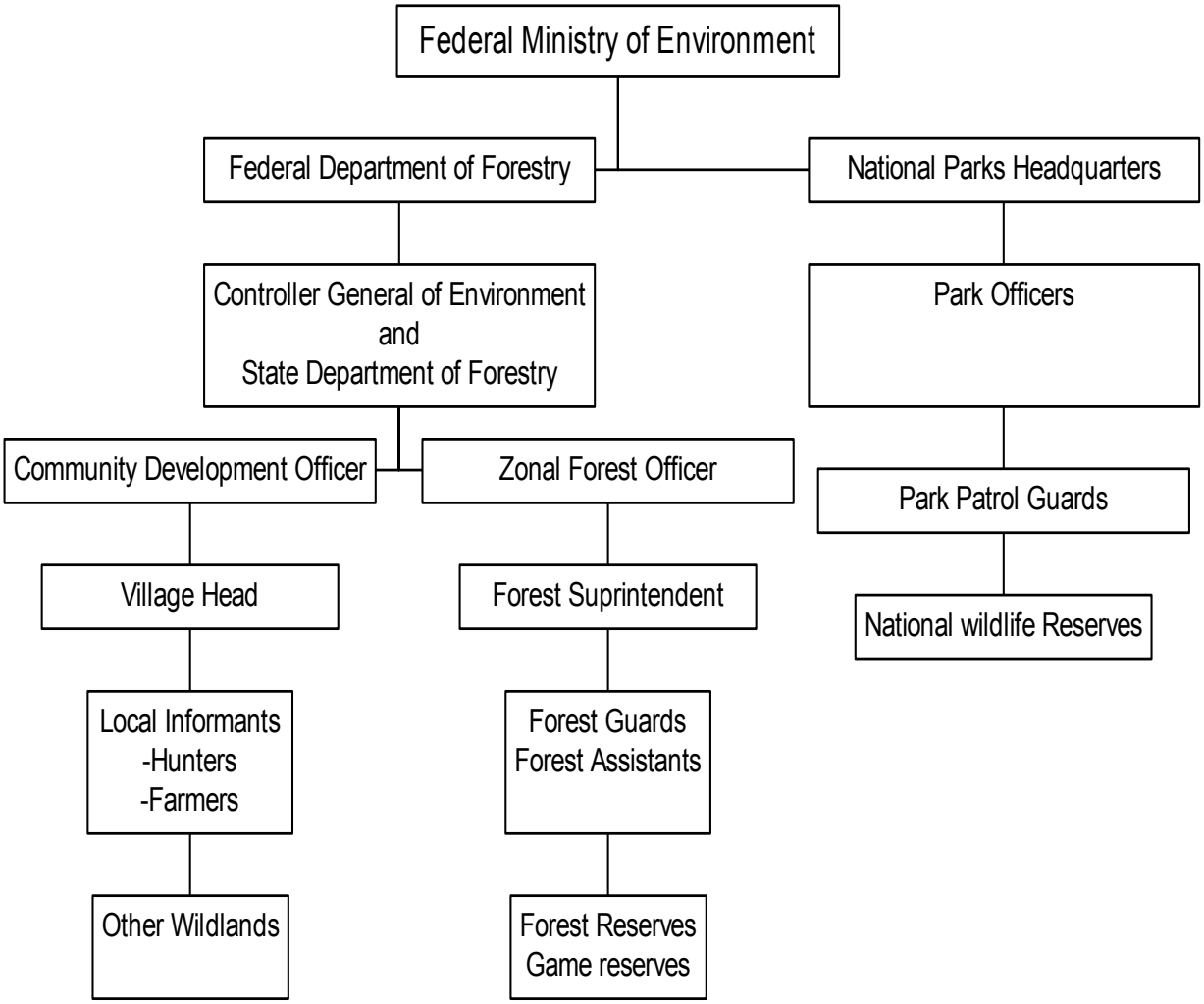
8. Existing structures for
(a) Fire monitoring
(b) Fire prevention
(c) Fire suppression
(d) Fire management and control

9. What are the barriers to the adoption of effective fire disaster and risk reduction strategies in Nigeria.

10. What are the functional fire-fighting/monitoring facilities on ground?

APPENDIX 4

Structure for proper wildland fire occurrence documentation



APPENDIX 5A

(see end of the report)

APPENDIX 5B

Description of the categories of vegetation types affected by fire to be documented on the forms:

I: Wildfires (uncontrolled/unwanted human-caused and lightning-caused fires)

Forest 1 Intensively managed / utilized and protected (incl. plantations):

All forests which are managed following the principles of sustainable forest management. This includes all forest plantations, even if these are not considered to be "sustainable". In most cases the fire cause an economic damage (except low-intensity surface fires, which may lead to minor damages or are considered beneficial).

Forest 2 Not intensively managed and protected:

All forests which do not belong to category Forest 1. Usually these are forested wildlands in which no forest management or forest protection takes place (e.g. boreal forest outside the fire protection zone, or tropical seasonal (dry, deciduous, semi-deciduous) forests which are regularly burned and adapted to fire. Fires are often not considered to cause economic damages.

Savanna/Shrubland 1 Intensively managed, utilized and protected:

Those ecosystems in which fire creates conflicts with sustainable management of wildlife, animal husbandry, watershed protection, and other natural resources management objectives, usually associated with economic losses and/or environmental degradation. Example: tropical and subtropical savannas, steppe ecosystems of the temperate/subboreal zone.

Savanna/Shrubland 2 Not intensively managed, utilized and protected:

Same or similar vegetation types, but no conflicts or immediate economic or environmental damages caused by wildfires, often due to adaptation to fire (fire climax ecosystems).

Grassland/Pastures Intensively managed and utilized (not in categories savanna 1 or 2):

Grasslands and pastures that are intensively managed grazing resources, usually in property of farms or commercial livestock rangelands.

II. Prescribed fires

This category includes all fire which are set intentionally and following a prescription, regardless whether the prescription follows rules of sustainable vegetation (fire) management or resulting in destruction or degradation on the ecosystem.

Prescribed pastoral & agricultural burning maintenance burning of pastures, agricultural waste disposal (straw of wheat, rice, sugar cane, etc.):

Traditional cyclic (often annual) burning of residues and plant biomass which is not utilized for any production purposes.

Traditional Shifting Cultivation with fallow and forest regeneration phases:

Non-permanent land-clearing following traditional shifting cultivation cycles (slash-and-burn) after which forest cover is allowed to return.

Permanent Land Clearing 1 Conversion of forest for plantation establishment:

Conversion of native primary or secondary vegetation (forest and other wildlands) to prepare land for tree plantations (forest plantations, other tree plantations like oil palm plantations).

Permanent Land Clearing 2 Conversion of forest to agriculture and pasture systems:

Native vegetation is completely removed and replaced by agricultural and pastoral systems.

Others (explain):

APPENDIX 6

Instructions on how the forms are to be completed and collated:

1. The Local Government (LG) daily fire data forms are to be used for documenting daily fire occurrence in forest charges, wildlife parks, free areas and agricultural lands. The forest charge officers, wildlife park officers and local government community development officers, will do this documentation. Copies of this documentation will then be submitted to the state department of forestry, from where it will then be submitted to the controller general of environment in each state.
2. The State annual fire data forms are to be used for documenting the summary of (1) above monthly for fire occurrences in forest charges, wildlife parks, free areas and agricultural lands in the state by the office of the controller general of environment in each state, who will forward same to the Federal Department of Forestry in Abuja.
3. The Country annual fire data forms are to be used for documenting the summary of (2) above monthly for fire occurrences in forest charges, wildlife parks, free areas and agricultural lands in all the states of the country by the Ministry of Environment. The Ministry of Environment can then submit the annual summary on the GVFI fire data form to the GVFI in Freiburg, Germany via email at the end of the year.

APPENDIX 5A

Fire inventory forms for local, state and country levels (attached below)

Biome Type	Area Burned (ha)	Average Fuel Burned (t)	Total Biomass Burned (t)	Fraction (%) Burned	Ignition by Lightning (%)	Source
Forest 1: Not intensively managed and protected						
Forest 2: Intensively managed and protected						
Savanna/ Shrubland 1: Not intensively managed and protected						
Savanna/ Shrubland 2: Intenisvely managed and protected						
Grasland/ Pastures (not in categories savanna 1/2) intensively managed						
Other agricultural lands (tree crops, e.g. cocoa, cashew, citrus, oil palm or straw burning, e.g. corn, wheat, rice paddies, sugar cane)						
Others (explain)						

Name of LG: **Officer:** **Rank:** **Date of Reference:**

Biome Type	Area Burned (ha/yr)	Average Fuel Burned (t/ha)	Total Biomass Burned (t/yr)	Fraction (%) Burned per Month												Ignition by Lightning (%)	Source
				1	2	3	4	5	6	7	8	9	10	11	12		
Forest 1: Not intensively managed and protected																	
Forest 2: Intensively managed and protected																	
Savanna/ Shrubland 1: Not intensively managed and protected																	
Savanna/ Shrubland 2: Intenisvely managed and protected																	
Grasland/ Pastures (not in categories savanna 1/2) intensively managed																	
Other agricultural lands (tree crops, e.g. cocoa, cashew, citrus, oil palm or straw burning, e.g. corn, wheat, rice paddies, sugar cane)																	
Other (explain)																	

Name of STATE: **Officer:** **Rank:** **Date of Reference:**

Biome Type	Area Burned (ha/yr)	Average Fuel Burned (t/ha)	Total Biomass Burned (t/yr)	Fraction (%) Burned per Month												Ignition by Lightning (%)	Source
				1	2	3	4	5	6	7	8	9	10	11	12		
Forest 1: Not intensively managed and protected																	
Forest 2: Intensively managed and protected																	
Savanna/ Shrubland 1: Not intensively managed and protected																	
Savanna/ Shrubland 2: Intenisvely managed and protected																	
Grasland/ Pastures (not in categories savanna 1/2) intensively managed																	
Other agricultural lands (tree crops, e.g. cocoa, cashew, citrus, oil palm or straw burning, e.g. corn, wheat, rice paddies, sugar cane)																	
Others (explain)																	
Name of COUNTRY:									**Years/Decade of Reference:**								