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Fires set by farmers in Murchison National Park. Photo: © Dennis Wegewijs - stock.adobe.com

Supporting effective fire management in Uganda

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"Managing wildfire risk requires concerted efforts to strengthen capacities and effective coordination between government authorities, the private sector and local communities."

Introduction

Most wildfires in Uganda occur in savanna parks and neighbouring forest reserves. Nearly all wildfires are human-caused, and some landscapes that once burned only at fairly long intervals are now burning multiple times within a 10-year period. This hinders succession and degrades ecosystems. Human-set fires, either in context of land use, accidental or intentional, pose a significant risk to biodiversity and to adjacent communities and their livelihoods.

The impacts of fire on natural ecosystems and wildlife in Uganda began to be recognized in the 1960s, in response to the need for a comprehensive strategy for fire management. The concept of a comprehensive strategy was first introduced for the savannah parks in the 1980s and 1990s, when the management of the Game and Fisheries Department concentrated their efforts on understanding the ecological aspects of the fire regime.

In the early 2000s, however, the Uganda Wildlife Authority (UWA) began to commission studies to assess the immediate effects of fires on the distribution and movement patterns of wildlife. Other work has shown the impact of fire on specific national parks and other protected areas (e.g. Plumptre et al. 2010).

Today, Uganda has a legal and policy framework to protect forests and other wildlife areas, but implementation is weak and laws are unevenly enforced. Also, protected area authorities do not have clear and well-developed strategies for combating wildfires. This article presents the context of fires in Uganda, past and current management, with the West Nile, Northern, and North eastern regions as a case study, and identifies challenges and key needs in moving forward in the development of effective fire management.

Fires in Uganda

Between 2003 and 2012, the annual area of forest burned varied from a high of 293,920 ha in 2003 and a low of 35,670 ha in 2008. About 1.4 million ha of all land burned in 2021 but this is normal, compared to previous years since 2001, with a record of 7.3 million ha in 2005. Uganda reported that 550,000 ha of forest alone were burned in 2000 (MWE 2017) and that the highest non-CO2 emissions from forest wildfires were from carbon monoxide, most of it attributable to burning woodlands.

Satellite images from 2000–12 were analyzed by the authorities, in order to zone areas prone to wildfires and generate a fire hazard map of Uganda (Figure 1). These images were obtained from the Regional Centre for Mapping of Resources for Development (RCMRD) in Nairobi. A total of 20 districts are at very high risk of wildfires; 13 districts are at high risk; and 17 are at medium risk. The Northern Region has the highest risk of wildfires, followed by parts of Teso sub-region, Rakai District and West Nile sub-region.

Some pastoralist and livestock-rearing communities use fire to burn pasture land. However, these fires can spread, and some have started disastrous wildfires. For example, a fire in January 2012 destroyed many acres of vegetation in the Pian Upe Wildlife Reserve. In February 2012 a fire displaced 24 families in Moyo district. In April 2012 a fire destroyed pasturelands in Karamoja sub-region.

Fire management in protected areas

Following efforts to recognize the impacts of fires in the 1960s, the approach was revamped in the 1980s and 1990s, when the management of public land in government estates concentrated on understanding the ecological aspects of fire regimes. In the early 2000s, UWA commissioned a study to understand the immediate effects of fires and burned areas on the distribution and ranging patterns of wildlife (Jaksic-Born 2004). This contributed to a more comprehensive understanding of how fire regimes influence herbivores' movements and habitat use, particularly with regard to fire management decision making and strategies for protecting natural habitats. However, whereas the ecological aspects of wildfires are now better understood, more work is required to assess the impacts of wildfires on communities and their livelihoods.

Fire management measures in Uganda were introduced by the Uganda Wildlife Authority in 2005, applying

Fire Incidence, 2010–20 **Fire Incidence, 2020**

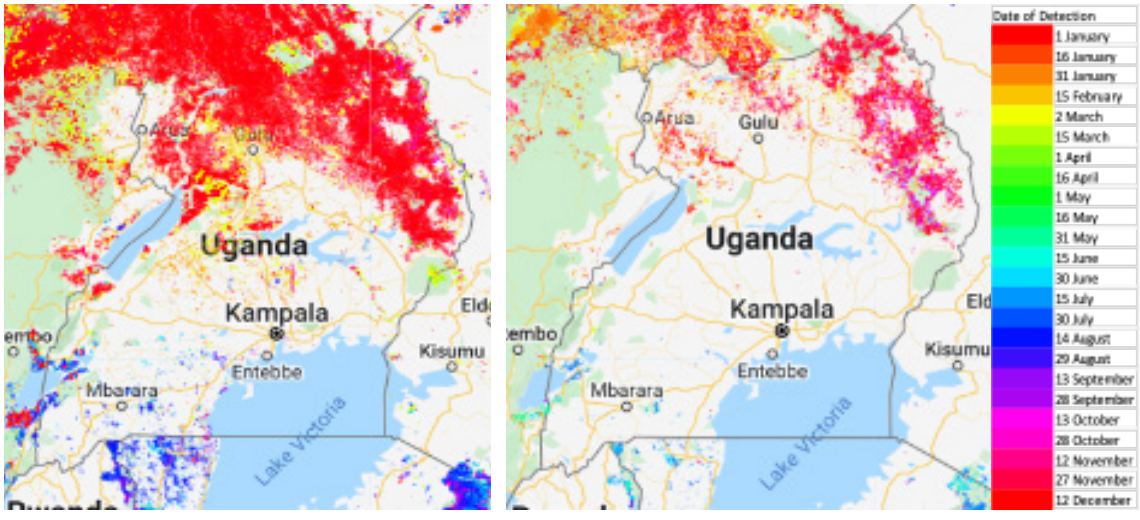

Figure 1: Fire incidence in 2010–20, and in 2020 alone. Source: Google Earth

controlled early burning in selected areas and creating fire barriers to act as firebreaks (Nangendo 2005). However, the effectiveness of these measures was not assessed. The National Forestry Authority also established firebreaks on the boundaries of some forest reserves, but they appear to be ineffective and are poorly maintained. Controlled and selectively applied early burning has now been used for 20 years by conservation managers as a tool for eliminating dry biomass and to maintain patchy vegetation. This builds on traditional fire use by farmers and pastoralists for bush clearing, pasture management and hunting, especially in the drier North, North western and North eastern regions. From these practices, lessons learned can be used to develop effective strategies. See Box 1.

Types of fire use in Uganda

Bush burning in traditional land management

Bush burning is used as a land management practice to clear land for cultivation (especially in the drier northern areas of the country), and coincides with the first rains of the season. This is also the time when hunting, especially of rodents, is common among the local communities.

Fires in traditional rangeland management – in the "cattle corridor"

Uganda's cattle corridor is the central pastoral belt that extends from Karamoja to Teso through the central districts of Kayunga, Nakasongora, Mubende and south through Mbarara and Rakai districts, which border Tanzania. In the corridor, fire has traditionally been used to clear grazing land of shrubs, to control ticks, and to allow new grass to sprout when the rains begin. If not overly frequent, fire also tends to maintain the existing vegetation structure, rather than causing changes in habitats. However, integrated fire management, as practised in protected areas and in timber plantations (e.g., Nakasongora District), appears to require additional incentives for people to adopt it in rangelands, especially as fire use is traditional there.

Box 1. Fire in the Albertine Rift

Wildfires are especially common in savannah parks such as Murchison Falls National Park in the Albertine Rift, western Uganda, where people regularly set fires to refresh grass for livestock, and for hunting wild animals. Fire has been singled out as a key element in determining the vegetation structure and floristic composition of such mosaic landscapes (Nangendo 2005). Increasing fire frequency results in decreased tree cover and a transition to more fire-resilient shrubland and savanna; however, controlled fires are essential in the management of savannah parks.

Adjoining Murchison Falls National Parkare Budongo and Bugoma forests, covering 80,000 ha and 40,000 ha, respectively. Both under central government protection, they are situated in a mosaic of forest, woodland and grassland, along with farmers' fields and areas of bush fallow. People set fires within forests and woodlands to clear land for cultivation, promote new growth, and harvest honey, but these fires often spread out of control and burn large areas. This impairs the regeneration of some trees, and forests may gradually be replaced by savanna. Fire also has impacts on wildlife, by killing animals, and indirectly by affecting species composition (Nangendo 2005). Fires also have both direct and indirect effects on communities and their livelihoods.

In Budongo Forest, early burning has long been recommended by the Forest Department for controlling bush encroachment and reducing risks to wildfire. It has hardly ever been practised, however, due to inadequate staffing at forest stations, and a lack of explicit fire-management plans. Unfortunately, the situation has not improved since the National Forestry Authority was established in 2003. Uncontrolled fires have become a major concern, but neither the National Forestry Authority or the Uganda Wildlife Authority are well equipped to prevent them, and once wildfires ignite, these agencies cannot control them.

Furthermore, there are new activities with the potential to cause more wildfires in the national park, including the exploration and exploitation of oil and gas reserves, expanding agrocommodity production (mostly sugarcane) and more pine and eucalyptus plantations. Other wildfire sources include fires set to clear land and bush for refugee resettlement in the area. The risks from all these activities are worsened by the current climate trends towards more prolonged dry spells. They worsen the wildfire risks to local communities and their livelihoods, and to the conservation of forest estates and biodiversity in the region. It is thus essential that a fire management strategy be developed and implemented.

Traditional controlled fires – in forests

Hunting and gathering are carried out in forests, especially by communities using rudimentary methods. Hunters and gatherers are encouraged to limit the use of fire; for example, by measures such as smoking vegetation rather than burning it during honey collection, and by collecting only during wet seasons.

Traditional controlled fires – in farmland

Burning fallows and agricultural residues reduces the labour needed to clear farmland before planting. It is a common practice in the northern and northeastern parts of the country. The risk of escaping wildfire can be reduced by using alternative mechanical methods other than fire to clear agricultural plots for planting if these plots are adjacent to forests, parks or other protected areas.

Controlled burning – in savannah parks

The Uganda Wildlife Authority promotes carrying out controlled burning at the end of the wet season so that fires are less intense. The size of areas to be burned is arbitrary, depending on boundaries such as rivers, swamps, gullies, roads and tracks that act as firebreaks. In some instances, firebreaks have been established, but are poorly maintained. It is essential to create a barrier through early burns along park boundaries to prevent fires from entering areas that are outside the control of the park authorities.

Malicious fires – in forests and plantations

Some fires are set intentionally by hostile communities, in retaliation for a refusal to allow them access rights, in order to use parts of the area to grow food crops, graze livestock or collect forest products. Malicious fires are also set for other reasons, such as land conflicts between communities and agrocommodity companies, low prices for outgrower communities (where fires are set on the nucleus estates) and criminal use to terrorize communities.

Lessons learned

Reducing human-caused fires will greatly minimize landscape impacts

Fire prevention greatly reduces the resources needed for fire suppression. Prevention programmes exist, and need only to be rolled out. Examples include the promotion of alternative methods to clear land for planting if plots are adjacent to forests, parks or other protected areas; awareness raising among communities to limit the use of fire for hunting and honey collection; promoting collective responsibility for and understanding of the impact of fires; and providing incentives for forest-adjacent communities. The last is especially important where fires are deliberately set to destroy forests and plantations because of disputes about access rights.

Implement existing guidelines for developing fire management plans for protected areas

Accidental fires occur during controlled burning programmes. UWA developed a set of guidelines that outlined how to categorize areas into risk zones; they also provided strategies for early burning and wildfire suppression, discussed the technical aspects of firefighting, and provided a template for a fire management plan (see DeMeo et al. 2010, Appendix D, for an annotated copy of the template). Fire management plans following this format have been developed for some national parks under wildlife crime prevention plans, including Queen Elizabeth National Park (2017–23) and Murchison Falls National Park (2017–23).

Involve all stakeholders

Many disparate groups need to come together and work on fire risk management planning and the preparation of a strategy and implementation guidelines. The following must not be omitted (but this list is not exclusive): communities living in and around fire-risk areas, National Environment Management Authority, National Forestry Authority, Uganda Wildlife Authority, Office of the Prime Minister, oil and gas companies and agrocommodity companies whose activities may start fires and whose assets are at risk from fires, the Petroleum Authority of Uganda, National Oil Palm Project and related national bodies.

Identify the fire management needs and capacity of concerned authorities

Undertaking a detailed gap analysis will improve the understanding of the capacity challenges faced by each department, organization and group included above. These gaps need to be addressed by implementing tailored training to meet short-term and long-term needs, and the provision of appropriate equipment where required

Develop fire management planning processes at local, landscape and national levels

Effective planning requires a holistic approach, rather than disjointed efforts, and there is an urgent need for effective coordination of wildfire management activities. This should come through a bottom-up approach, where stakeholders at the landscape level come together under

a common platform; this should later transform into a national platform. Given the inadequacy of information about wildfires, research at the landscape level should be useful to stakeholders, who can then participate in a national-level platform to better inform policy and guidelines.

Conclusions

Understanding fire ecology is a primary consideration in developing and implementing fire management planning processes. Land capability, including climate, drives the types and sizes of fires. It is very important to acknowledge these differences in order to plan effectively. For example, some high-risk forests must be protected from wildfires, whereas in savanna ecosystems, fire plays an integral role. It is also essential to improve the understanding of the human use of fire, and to develop and implement guidelines for all stakeholders that align with their respective management priorities. Last, there is need to assess the needs of the key stakeholders in managing wildfires, and where appropriate, equip them with skills and equipment to manage risks.

Complementing this are three overarching considerations, as the country moves forward to developing, adopting and implementing an effective fire management strategy: communication, collaboration and coordination.

- *Communication*: to disseminate knowledge and understanding of wildfires causes and impacts to all actors at all levels, so this can be built into both planning and operational processes.
- *Collaboration*: to initiate a fire management planning process that involves key partners and stakeholders, and includes local communities, to jointly develop both landscape-wide and site-specific forest and wildfire management plans. Community engagement and awareness must be central to all efforts, and stakeholder platforms, which are valuable for building relations within a landscape, need to be developed.
- *Coordination*: to strengthen inter-agency coordination and build a strong working relationship between state and non-state actors. Government agencies, the private sector, civil society and local communities must work together in order to make effective fire management plans. Concerted and coordinated planning should then lead to the development of a national fire management strategy, to be adopted by the National Environment Management Authority and enforced as policy in consortium with other government agencies.

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