Assessing wildfires from the air, in the Bale Mountains. Photo: GFMC

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Fire management in Ethiopia: past, present and future

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"A national fire management strategy is required, inclusively developed across sectors and with multi-stakeholder support."

Introduction

In Ethiopia, wildfire has played a fundamental role in the evolution of dryland ecological systems, and fire is a common element in the ecology of rangelands, savannas, shrubland, woodlands and dry forests. The frequency and impacts of wildfires have increased in recent decades, however, especially in the western and southwestern woodlands and national parks, due to increased human activities (Johansson et al. 2019). Prohibiting the use of fire in the rangelands of southern Ethiopia since the 1980s is blamed for allowing bush to encroach into grasslands, with severe effects on biodiversity and pastoral livelihoods (FfE 2009).

The 2018 *National Forest Law* states that forest developers and users must protect forests from fires and must report fire occurrence at once to responsible bodies; the law can impose sentences of 1 to 10 years for setting fires in forests (FDRE 2018). However, the law does not specify

Burned land after a wildfire in the Bale Mountains, Ethiopia. Photo: GFMC

the role of federal and regional governments in fire management, beyond enforcement. There is no national fire management strategy or policy.

This article reviews the history, causes and impacts of wildfires in Ethiopia, identifies gaps, and discusses plans for improving fire management using an integrated approach at national, subnational and community levels.

History of fire use and wildfire

Centuries ago, warring parties set fires in Ethiopia's high forests to chase out their enemies (Lemessa and Perault 2001), and feudal lords cleared forests on mountaintops to establish settlements from which they could observe enemies in the distance (Teketay 2001). There is a long history of using fire to clear forests to establish new settlements and open up new farming land.

Climate change — with more frequent and severe drought — is an important factor in the increase in the number and intensity of wildfires. In 1984, wildfires affected more than 300,000 ha in Ethiopia; two-thirds of them were in high forests (Lemessa and Perault 2001). During the 2000 drought many large fires damaged more than 150,000 ha of forests (FfE 2009) and forced the country to call for international assistance (Bekele and Mengesha 2001). The fires of 2000 greatly affected Awash and Nechsar national parks, Borana woodlands and the grasslands of pastoral areas, eastern Ethiopia and the Bale Mountains (FfE 2009). There were also major wildfires in the Bale mountains in 2007 and 2008, and in Yayu Biosphere Reserve in 2013.

Human pressure and intensified drought have seen Ethiopia recurrently affected by severe wildfire emergencies since 2019. Severe wildfires have affected most ecosystems, including humid forests and protected areas and sites receiving international funding, including under the REDD+ programme. In 2019, major wildfires in Simien National Park, a UNESCO World Heritage Site, took more than a month to be effectively controlled and then only after international support was obtained. Wof Washa forest was severely affected in 2021, when 14,688 ha were burned (EFCCC 2021).

Wildfires are common in the western lowlands, which are dominated by woodland, bamboo and grassland. These fire-adapted ecological systems are characterized and shaped by frequent natural and anthropogenic fires. Grasslands are especially prone to fire between March and May. People clear large areas for commercial farms, and burn crop residues rather than using them as fodder; these fires sometimes spread into woodlands. Trans-boundary fires cross to and from Sudan and South Sudan. Wildfires also occur in the forests of southern Ethiopia, which have little previous fire history.

Wildfire causes

Most wildfires spread from fires started by people, accidently in and around parks, and intentionally during the dry season by farmers and pastoralists (Teketay

2000; Lemessa and Perault 2001; FfE 2009; Johansson et al. 2019). Fire is used to clear rangelands of unpalatable dry grasses, invasive bushes and parasites that affect livestock, and to encourage the growth of fresh, palatable grasses for livestock grazing; to clear fields of crop residues and other unwanted vegetation during land preparation; and to clear forest and bushland for settlements and crop production or for tea or coffee plantations. Fire is also used to facilitate access; to drive away wild animals and rodents that damage crops, and snakes, parasites, toxic caterpillars and predators harmful to people and livestock; to harvest wild honey; and to clear the stumps of illegally cut trees, or during illegal charcoal making in woodland and dry forests. Fires set for these purposes frequently spread out of control. Agricultural burning, accidental fires and fire for traditional land management were reported as the cause of the loss of large forest areas in the Bale Mountains in 2000 and 2008 (Goldammer 2000; Belayneh et al. 2013).

Arson is another cause of wildfires. People set fires in national parks to demonstrate against park management. Each park has its own administration, with rangers responsible for routine management. The lack of negotiated benefit-sharing arrangements for park revenue leads to tension with surrounding communities, whose livelihoods have been undermined by the loss of access to water, pasture and trees within park boundaries. Fuel also builds up within parks. This means that fires in national parks, while perhaps less frequent, can be much more intense when they do occur, in spite of efforts to suppress outbreaks (Johansson et al. 2019).

Wildfires result from a complex set of social, political and economic circumstances. These are rooted in interrelated factors such as rural poverty, growing population pressure and low agricultural productivity (which drives smallholders to expand the area they farm), the absence of operational land-use policies, and weak capacity in forest tenure and law enforcement (Lemessa and Perault 2001).

Gaps in fire management capacity

Fires not only damage natural resources; they also undermine efforts to conserve natural forests and restore degraded landscapes through assisted natural regeneration, afforestation or reforestation. Recent wildfires highlight the gaps in Ethiopia's capacity to predict and control these fires. See Box 1.

Assessing fire profiles for countries, including Ethiopia (Goldammer and Mutch 2001), suggested that a system was needed for collecting meaningful fire data, and that wildfire reporting was hindered by limited capacity. The assessment concluded that the emphasis on emergency responses must be coupled with sustainable land-use policies and practices, and with effective inter-sectoral coordination, all of which help to reduce wildfire impacts.

Preliminary discussions between the authors and national government entities in 2022 involved the absence of a fire management plan and weak capacity for rapid responses to fire emergencies. After disastrous forest fires in 2000, a national roundtable conference was held by the Ministry of Agriculture with GTZ and GFMC, where a draft long-term fire management plan was discussed (Goldammer 2001). This was a serious attempt to develop an integrated forest fire management strategy that would establish measures for prevention and control, while accommodating the use of fire as a land management tool, and use remote sensing to provide early warning. However, no concrete steps were since taken beyond the drafting of a manual to control forest fires, which was not taken up effectively.

Box 1. Major gaps in fire management capacity

These gaps in capacity need to be addressed in order to develop effective fire management:

- incomplete understanding of the root causes of human-induced fires;
- limited data on trends in fire frequency and intensity, and high-risk areas;
- lack of a national forest fire management strategy that defines the mechanisms to prevent, detect, report and suppress fires;
- lack of a national land-use policy and plan;
- limited coordination between the forest law and laws in other sectors;
- few forest management plans, which are necessary to implement the revised National Forest Law;
- weak enforcement of existing laws;
- poor coordination and communication between various actors at various levels of government in and between regional states; and
- lack of firefighting equipment and trained firefighters, with a heavy reliance on international support and using local citizens and security personnel only for fire suppression.

To address these gaps and develop a national strategy, these actions are needed:

- identify and address the root causes of wildfires;
- gather data on fire risk and fire occurrence;
- update the map of high-risk areas;
- update the chronology of wildfire incidences;
- carry out efficient measures to prevent wildfire;
- establish and implement a mechanism to rapidly detect and suppress wildfires;
- build technological, financial, logistical and human capacity to forecast, detect, report and suppress forest fires and undertake post-fire rehabilitation measures;
- institutionalize mechanisms for networking, collaboration and coordination of actors at all levels;
- build on indigenous knowledge of wildfire prevention and management;
- ensure the participation of local administrations and communities in developing and implementing fire management plans; and
- allocate the required resources to develop and implement management plans.

The need for a national strategy

Not having a national wildfire management strategy continues to undermine Ethiopia's capacity for forecasting, preventing and suppressing wildfire. Fire management must be an integral part of land-use management policies and practices. These measures must consider cultural values and socioeconomic realities, as well as ecological differences in the areas where fires occur, including rangelands, dry forests and woodlands. In addition, multi-level governance is needed (EFCCC 2019). The devolution of responsibility and increased support for local decision-making are also important.

A national wildfire management strategy must be accompanied by an implementation plan, which must have the requisite financing. Potential financing mechanisms include establishing trust funds to support investments in measures such as constructing fuelbreaks, through revenues from taxes on charcoal and other forest products. Such investments could provide an opportunity to create employment for jobless and otherwise disadvantaged communities. Ethiopia lacks even basic capacity for fire suppression, and resorts to mobilizing soldiers, police and students when a major fire occurs. The country needs trained and properly equipped firefighters. Perhaps more importantly, there needs to be a paradigm shift towards accepting the need to live with fire where it is an inescapable part of local ecosystems and where its controlled use enhances rural livelihoods.

The national strategy must emphasize forecasting and prevention, early detection and swift action to suppress fire, using advances in science and technology, and identifying and addressing the challenges associated with scarce resources and uncoordinated institutional aspects. Fire management must also be integrated into the development of local livelihoods and in policy frameworks for sustainable land use. In addition, fire management must be seen in a broader policy context with respect to energy and Ethiopia's nationally determined contributions (NDCs). Carbon emissions from fires are not quantified or accounted for in the country. Since illegal charcoal production is another cause of fire, policy reforms in the energy sector could thus have positive effects on fire management.

Prohibiting traditional fire management in national parks and protected areas contributes to the expansion of tree cover and to carbon capture. This helps Ethiopia meet its NDC commitments, which depend heavily on forests and dryland restoration. But this approach also leads to a build-up of biomass that in the long term makes wildfires more likely and more intense, offsetting any shorter-term gains in carbon capture. Forests play a crucial role in climate change adaptation and mitigation: land use, land-use change and forestry (LULUCF) account for more than 80% of Ethiopia's mitigation contribution.

Following recent extreme wildfire events, there is a greater recognition and sense of urgency among policy makers, communities and development partners of the need to build capacity and to develop a well-informed fire management strategy. The national government is now taking steps to do this.

Towards improved fire management

Ethiopian Forestry Development (EFD), an autonomous federal body, is eager to address gaps in capacity and establish a coherent and effective fire management strategy. After forest fires in 2021, EFD took the lead in bringing together regional task teams to enhance the coordination of firefighting efforts. EFD worked with Italy's CIMA Foundation to develop a forest fire early-warning system using the myDEWETRA tool to collate and distribute remote sensing data in bulletins shared with regions (CIMA Foundation n.d.). This project, which ended in 2021, involved a capacity-building component. EFD has called for development partners to assist with new collaborative initiatives.

To support these efforts, the Pastoral and Environmental Network in the Horn of Africa (PENHA)-TBI and CIFOR-ICRAF have begun a joint programme, and federal- and state-level forestry agencies have expressed their desire to participate. The programme will include developing a draft national wildfire management strategy that relevant national authorities will ultimately implement. Implementation will contribute to high-level conservation impacts of reduced loss of forests and woodlands and minimized emissions from wildfires. The strategy and its action plan will help Ethiopia build capacity at the federal and regional levels to assess wildfire risk, share up-to-date information and undertake effective responses in fire detection, mitigation and control. The strategy will establish and make functional an inclusive fire management platform that brings together federal and regional government agencies, NGOs and community organizations. It will also build the capacity of actors engaged in implementing the strategy, with an emphasis on preventing, predicting, detecting, reporting and suppressing fires, while also integrating climate-smart practices in post-fire rehabilitation.

In summary, the programme aims to achieve five goals:

1. assess national forest management policies and fire management practices to identify opportunities and challenges;
2. map and prioritize high-risk areas where efforts and resources should be focused;
3. identify capacity gaps;
4. prepare a draft strategy to be considered by national authorities for assessing and acting on wildfire risk and making fire management part of forest and rangeland management decisions; and
5. facilitate experience-sharing between countries with improved capacity.

Conclusions

The PENHA-TBI/CIFOR-ICRAF programme will help fill gaps, but this alone will not meet the urgent need to improve fire management in Ethiopia and reduce the negative environmental, social and economic impacts of wildfires. Also needed is a concerted effort by government to promote participation, build awareness and understanding, change mindsets at community and policy levels, encourage cooperation between actors, and include development partners. This requires a sustained commitment over time.

Continuous capacity building is essential to address limitations at multiple levels, with the appropriate training and support. There is also a need for basic firefighting equipment, to reduce reliance on external assistance, and for establishing more efficient coordination with international partners for swifter and more effective responses. It is also extremely important to build task forces at the local level, and to train and equip them for rapid fire detection and suppression. These efforts should involve local administrations, communities and trained and equipped firefighters, and be supported by sufficient resources and coordination mechanisms.

Burned area in the Bale Mountains. Being able to collect data on areas burned is an essential component of fire management. Photo GFMC

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