Wildfires are increasing in intensity and severity in Ghana.
Photo: Joseph Asante

# Inclusive fire management in Ghana's transitional zone

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*"Meeting long-term forest restoration goals requires prescribed and well-managed burns that pose minimal ecological and social risk."*

## Introduction

Fire use is integral to sustainable smallholder land use in much of sub-Saharan Africa, but poor fire management practices — coupled with hotter and drier weather conditions — have resulted in more wildfires. In addition, ever more conservation efforts and conversion of land are threatening the sustainability of biodiversity resources and livelihoods. Moreover, with population pressures and urban sprawl, more people are living and working in areas of high fire risk, thus increasing both the chance of wildfires occurring, and of local people suffering their consequences.

In Ghana, wildfires are now an annual occurrence (Appiah et al. 2010), resulting in the loss of lives, property and biodiversity. The annual loss of revenue from marketable timber due to wildfire is estimated at US$24 million (MLNR 2011). Similarly, wildfire damage to farms, agricultural produce and biodiversity resources remains extensive but unvalued, and little

A burned teak plantation in Atebubu-Amantin Municipal District. Photo: Joseph Asante

compensation is available. The Ministry of Land and Natural Resources estimated that by 2012 the annual total land area prone to forest fires would range from 30% in the high forest and transitional zones to more than 90% in the dry northern savannah zone (MLFM 2006). Increasing wildfires are blamed on the continued expansion of land conversion for farming using fire and on other livelihood pursuits, including hunting, charcoal production and cultural practices.

This article documents experiences and lessons from the Collaborative and Adaptative Community Fire Management initiative, implemented by Tropenbos Ghana under the project, Forest Landscape Restoration Through a Sustainable Wood Energy Value Chain. The approach was informed through local community consultations and a review of fire management policies and regulations, leading to support and incentives for safe and effective fire use and management. It is hoped that these findings can inform fire management practices elsewhere, while acknowledging that collaborative and adaptive community fire management is an evolving process and so requires constant learning to improve future practices.

## The role of fire

Forest fires play crucial roles in maintaining forest ecosystems through recycling nutrients, promoting flowering and seed germination, and enhancing the sprouting of fresh browse. Fires can be beneficial in terms of reducing fuel loads and maintaining species composition and structure in fire-tolerant and fire-resistant ecosystems.

Wildfires, however, have been reported to cause forest degradation (Kosoe et al. 2015) and deforestation in Ghana (Danquah 2009). Forest fires also cause significant damage to timber resources, degrade soils and destroy biological resources. Increasingly frequent wildfires are burning large patches in dry forest areas that now suffer severe fires, but that were historically dominated by low-severity and moderate fires. This may be creating a shift to new states that will not sustain the same ecological and social functions.

Wildfires are modifying the structure and composition of natural forests in Ghana at rates that far exceed those of mechanical thinning and prescribed fire treatments (Reynolds et al. 2013). This demonstrates the threats that wildfire can pose to restoration efforts if it is not considered in a broad framework. Although the pace and scale of improved fire management have been increasing, wildfire continues to be the primary agent affecting vegetation across Ghana. This underscores the need to address the risks and effects of wildfires in planning for forest landscape restoration.

## Fire trends and causes

Both 2014 and 2015 were record wildfire years in Ghana, across a wide range of natural and managed forest and other lands, and including large areas of high-severity burns. Wildfires also recurred in many areas that were receiving post-fire restoration efforts following previous burns. Ankasa Forest Reserve and neighbouring areas faced an increased occurrence of wildfires from 2015 to 2017 (Husseini et al. 2020). Since 2018, large parts of some major forest reserves — even in Ghana's high forest zone

— burned, including Abonyere and Bonsampepo, and the situation in the savanna zone also worsened. These major fire events presented a huge challenge to managers, stakeholder groups and communities in obtaining resources for restoring burned areas and protecting the rest of the landscape.

Various factors have been put forward as the cause of the alarming and increasing rates of deforestation in Ghana. Prominent among these in the northern savanna and transitional zones are land clearing for farming or new settlements, illegal logging for foreign exchange or local construction, and charcoal production, coupled with windstorms and prolonged drought. These factors are also interdependent.

Organizational issues that hamper wildfire prevention and suppression (Agyemang et al. 2015) include (i) poor institutional coordination and collaboration and unclear responsibilities; (ii) limited stakeholder involvement in wildfire discourse; (iii) limited understanding of wildfire trends; and (iv) the adoption of less effective and non-comprehensive approaches to fire management. However, farmers are also known to have knowledge that they use to manage wildfires that should be supported (Amissah 2009; Amissah et al. 2010).

## National fire policies

Recognizing the need to address the effects of wildfires on forests and other ecosystems, the Ministry of Lands and Forestry developed the National Wildfire Policy in 2006. The policy promotes effective and efficient fire management for the sustainable use of natural resources and maintenance of the environment. Subsequent to this, fire management guidelines were drawn up, including the Procedure for Community-Based Fire Management in 2011, with the support of local and international organizations. However, these measures have not been adequately implemented, resulting in an increase in wildfires.

The 2012 revision of the Forest and Wildlife Policy also did not bring any change to the situation. A critical review of this policy (strategic direction 1.6) indicates a lapse in addressing the challenges of wildfire control, with an absence of explicit directives as to how logistical support for fire control will be made available. Furthermore, the management framework that is meant to address challenges to fighting wildfires includes sensitization and training on reactive mechanisms (e.g., creating firebreaks) only after a wildfire is reported.

The Ghana National Fire Service Act, 1997 (Act 537) was also intended to provide for the management of uncontrolled fires and make provisions for forest fires. However, the Act was flawed with respect to wildfire management as it was highly skewed towards industrial and domestic fires, rather than wildfires. Overall, Ghana's existing legal policies on forestry, wildlife and environmental management do not include adequate explicit measure to prevent and manage wildfires (Husseini et al. 2020).



Community engagement in effective fire use and wildfire prevention in Atebubu-Amantin Municipal District. Photo: Joseph Asante

Training of community fire volunteers in Atebubu-Amantin Municipal District. Photo: Daniel Kofi Abu

## Applying community fire management approaches

Collaborative and adaptive community fire management was introduced to ten charcoal-producing communities as part of the Forest Landscape Restoration through a Sustainable Wood Energy Value Chain project. It was implemented jointly in 2020–22 by GIZ, Ghana's Ministry of Lands and Natural Resources, and the Ministry of Energy, in partnership with IUCN NL and three local implementing partners: IUCN-Ghana, Tropenbos Ghana, and A Rocha Ghana. The project worked with landowners and smallholders to restore forest landscapes in Bono East (Kintampo and Atebubu communities) and Savanna (Mole National Park) regions, which are prone to bush fires. It built on previous work in these areas by Tropenbos Ghana and partners on forest protection, agroforestry and restoration.

The project's specific objectives were to support reforestation for sustainable wood energy production on degraded land, rehabilitate degraded parts of forest reserves, and improve energy efficiency. The experiences gained were used to inform the implementation of the national climate policy and REDD+ strategy, and contributed to the improvement of the framework for sustainable forest management and climate adaption and mitigation.

The project took an approach to fire management that was adaptive and inclusive. The approach involved the development of community fire-management structures, including the establishment of community fire volunteer groups. Stakeholder collaboration was ensured at the community, district and national level, because neither community- or district-level stakeholders can implement effective fire use and management in isolation. Collaborative action included the participation of communities in accepting and adopting effective practices of fire use and management, with the capacity to integrate fire-use and management plans in their land-use activities.

Capacity building in current fire use and management practices included forming a fire volunteer group in each community and in the community at large, for farmers, charcoal producers, traditional authorities, schoolchildren, etc. Capacity development for the fire volunteer groups included training in fire detection and suppression, use of a fire danger rating system to provide indications of potential wildfires, understanding how fires start, and knowledge of fire behaviour. This enabled the leaders of community fire brigades to develop effective fire pre-suppression and suppression plans to help make decisions on when, where and how to safely control fires.

The approach also targeted post-fire management strategies and climate action, including the restoration of degraded forest areas and riverbanks, and integrating trees on farms. The rationale was to support communities to take steps to improve target areas while also ensuring that fire-prone areas have the capacity to recover after wildfires.

Furthermore, a comprehensive incentive mechanism was introduced to encourage communities to participate and to establish a sense of local ownership of and responsibility for fire management. This included support

for community tree nurseries by engaging local people to supply tree seedlings for the restoration of degraded areas and for on-farm planting. Other incentives included providing firefighting equipment, communication tools and mobility support to community fire volunteer groups, so they were able to mobilize and respond promptly to fire emergencies.

## Positive outcomes

The target communities collaboratively developed and implemented restoration and fire management plans, including detailed hazard analysis and incidence of fire ratios. The plans defined the actions to be taken to control fire and continuously maintain restored areas. This inclusive approach to fire management enhanced community involvement in decision making and fire planning. It has led to other stakeholders collaborating with them in fire use and management, including farmers, traditional authorities and state institutions. As a result, communities have much more capacity to engage in discussions on fire use and management, and that has positioned them as strategic participants for future engagement. Another key outcome is an increase in tree and forest cover in target areas. Participants planted more than 500,000 tree seedlings during the course of the project, covering more than 250 hectares (ha). This will ultimately contribute to climate change mitigation and adaptation efforts while also improving conditions for other livelihood activities, particularly farming.

Landscapes within the project's target areas were in zones of moderate to high or very high fire risk (Figure 1). One project result has been the reduction of wildfires during the intervention period (2020–22), particularly around sacred groves and restored sites. The communities have thus worked to safeguard their land against wildfires, including restored forests, farms and parklands. This achievement is attributed to the communities' adherence to local rules on fire use and management, supervision by volunteer fire groups of fire use during land preparation, and prompt reporting of and responding to fire outbreaks. It is expected that communities will sustain these strategies and response systems and continue to manage fires effectively.

As one community member said, "…we cannot live without fire: we must learn how to collectively manage it." Meeting long-term dry forest restoration goals will require increases in prescribed and well-managed burns that pose minimal ecological and social risk. The key trade-off associated with dry forest restoration concerns the balance between the scale of restoration and the level of fire resiliency.

## Conclusions

Forest landscape restoration and fire management are inextricably linked, particularly in Ghana's transitional zone and in the drier areas in the north of the country. Any attempt at FLR therefore must include an effective system of fire management. Collaborative and adaptive community fire management — that strengthens
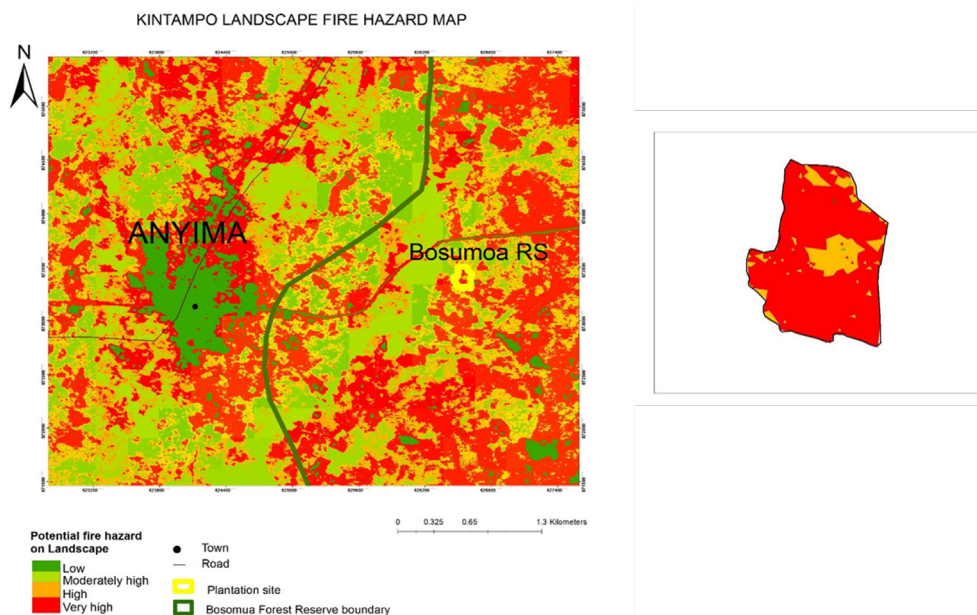


Figure 1: Fire risk in Anyima, one of the project's target areas. Most of the target area is at very high fire risk.
Source: GIZ Forest Landscape Restoration Project, 2020.

local capacity and ensures local inclusion through appropriate incentives — has proven to be effective. This is key in reducing the menace of wildfires that threaten communities in the transitional zone of Ghana. Fire use and fire management under the project's approach is making progress toward restoration and climate adaptation goals, improving the alignment of forests' structural mosaic and re-establishing and stabilizing fire-vegetation feedback. However, efforts are required to drive this inclusive approach in fire management at scale; policy makers must initiate reforms to make fire laws and regulations more workable and easily implemented.

Like most disasters, when the smoke clears, questions are raised; in particular, what could have been done to minimize such events, and the associated risk? Past studies and wildfire mapping in Ghana have identified incentives and fire management training as key to effective collaborative and adaptive community fire management. These findings shaped Tropenbos Ghana's fire management approach in the country's transitional zone, based on the understanding that communities who are endowed with knowledge on fire use and management can therefore assess and manage fires effectively. Core to this is strengthening communities' capacity to understand fire and actively participate in its management, while also providing incentives such as suitable firefighting equipment, communication tools and mobility support.

Beneficiary communities can now effectively engage with other actors in fire use and management dialogues, and have practically demonstrated effective fire management capability by successfully safeguarding 252 ha of restored forests, riparian zones and agroforestry parklands. Evidence from this adaptive and collaborative community fire management initiative shows that communities can effectively and efficiently use and manage fires if they have the support they need. This includes enhanced capacity in contemporary fire management practices for all relevant actors, coupled with policy and regulatory reforms that stress multi-stakeholder inclusiveness in fire management at scale.

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