



Fire volunteers reducing the fuel load to slow the spread of a fire.
Photo: Melle Meivogel

A community-based approach to wildfire prevention in Ghana

Rosa Diemont and Tieme Wanders

“Through cooperation, people have learned that together, they could become responsible for reducing risks, and took active steps to prevent wildfire outbreaks.”

Introduction

Forests in Ghana are increasingly influenced by human-induced fires. Until the 1980s, uncontrolled wildfires were relatively uncommon in the country, especially in the forest zone in the south. Many older farmers recall the extremely dry year of 1983 as the tipping point, when the country experienced devastating wildfires that destroyed forests and lives, villages and livelihoods. Since then, wildfires have become an annual phenomenon in Ghana’s landscapes during the dry season, and decision makers must consider how to reduce their frequency and impacts.

Form Ghana is a forest plantation management company based in the central part of the country that produces timber and carbon credits for local and international markets. One of Form Ghana’s land leases is within the Tain II Forest Reserve in Bono Region. Together with Form International,



Wildfire spreading towards the Tain II Forest Reserve. Photo: Rosa Diemont

the company developed the Forest Landscape Restoration Programme in 2017 to collaborate with neighbouring smallholder communities in improving local livelihoods. Most community land is managed under the traditional authority of chiefs and their families, and many people rely on farming as their sole source of income.

This article describes how a community based approach has reduced wildfire outbreaks by 78% between 2018 and 2021. From a situation in which wildfires were frequent, where nobody felt responsible and from which everybody suffered, people now make efforts to manage the risk and help to prevent wildfire outbreaks.

Fire in the landscape

The Tain II Forest Reserve lies within the Eastern Guinean lowland forest zone. It was once completely covered with dry, semi-deciduous forest that played a vital role in the lives of local people. Today, however, very little of the original forest remains, and human-induced degradation has led to vast areas of the reserve becoming bush land and savannah. Farming and annual wildfires have promoted the growth of the tall and fast-growing elephant grass (*Cenchrus purpureus*), which inhibits the natural regeneration of forest species. This grass is quick to ignite during the dry season (December to March), when humidity drops to below 10% in the daytime, and the Harmattan winds further dry out the vegetation; they can also severely limit visibility. The poor road network hinders rapid response to fires in remote areas. These

elements combine to contribute to severe uncontrollable fires that further degrade unmanaged areas within and around the forest reserve.

In this lowland forest zone, fire is not a natural phenomenon. The wildfires that do occur all spread from fires that are intentionally set by farmers in the surrounding landscapes, and spread from there into the reserve. In Ghana, the use of fire is a longstanding practice by smallholders to clear land for cultivation, and is also used by hunters, herders and beekeepers, who are all often blamed for the fire outbreaks. In addition, it is often mentioned that local communities have limited knowledge of fire management, and the bylaws of many Ghanaian districts prohibit the use of fire during the dry season. However, the outlawing of burning and making this traditional practice illegal have not had the desired result. Throughout Ghana the risk of wildfires continues, threatening lives, farms and property. Furthermore, prohibiting the use of fire limits farmers' control over their land, and also creates conflicts between farmers and other occupational groups. To avoid punishment, each group blames the other for setting the fires.

More fires also create a vicious cycle that increases the risks of yet more wildfires. Farmers become discouraged from investing in perennial crops such as fruit and nut trees. When an area burns every year, farmers will plant only annual crops and harvest them before the dry season. This leaves farmland unmanaged after harvest, allowing wildfires to spread freely through the landscape.

Farmers were very unhappy with this situation, but felt that they could do nothing about it on their own. Only by acting together at a landscape level could they hope to make impactful changes.

Towards a grassroots solution

The Forest Landscape Restoration Programme brought together all the key stakeholders, including traditional authorities, three regional departments of the Ghana National Fire Service, and the Ghana Forestry Commission. In the initial phase of the programme participants soon realized that outlawing burning in the dry season was not the way forward, as fire is part of the way of life in farming communities. To counter the accelerating degradation and to stimulate forest restoration, incidences of fire in the area had to be reduced by increasing awareness and drastically changing the roles of people in wildfire management.

Since the *Control and Prevention of Bushfires Act* of 1990 was enacted, the regional offices of the Ghana National Fire Service have been responsible for fire management. They operate through a system of community fire volunteers who they appoint. These volunteers make daily patrols during the dry season and have the right to arrest offenders and report them to the police. However, the fire service does not have the resources to implement education programmes, or to help fire volunteers execute pre-fire-season prevention programmes and fight wildfires. All the responsibility for mobilization,

organization and firefighting has been left completely to the volunteers themselves.

Importantly, the programme team found that traditional leaders — who in Ghana are the stewards of the land — were not involved in decision making regarding the appointment and operations of the community fire volunteer squads. This resulted in conflicts of interest, which reduced the squads' effectiveness at the village level.

For this reason, the first step of the programme was to engage with traditional authorities and community leaders. Together with them, the Ghana National Fire Service and the community fire volunteers developed an integrated community fire management project. They proposed and jointly agreed on structural changes, including the revision of local bylaws to allow farmers to use fire under certain conditions. These conditions are that a community must have trained, operational and equipped community fire volunteers who work according to a set of operating procedures.

The structural changes led to a significant shift in how everybody in the community perceived fire. Instead of fire being an outlawed and taboo activity, with punishments for those that used it, the programme could now focus on making people capable of and responsible for taking preventive measures to reduce wildfire risks and to use fire responsibly.



All the relevant authorities presenting the first jointly designed and aligned approach to fire management.
Photo: Melle Meivogel



A signboard showing the current fire danger index. Photo: Rosa Diemont

Improving effectiveness

Working together, the participants developed an improved operational structure by adapting traditional working practices, and by adding new measures, such as the use of a fire danger index and allowing controlled burns that are regulated through a permit system.

In each volunteer fire squad, the appointed leader and a leader-assistant prepare a fire management plan that includes community activities to limit fire outbreaks in the coming dry season. They then present the plan to the village chief, who has to formally approve it and give the mandate to call people to action. Squad leaders are responsible for organizing volunteers, mobilizing farmers to prepare farms before the dry season, and undertaking other collective actions such as weeding the firebreaks.

Squad leaders trained by the programme in turn train volunteer squads and community members in topics such as being fire-wise, and the consequences of using fire. Key to the training was raising awareness in the communities of the new rules and regulations, and of the permit system for controlled burns. In the new system, the fire squad can give permission for starting a fire. If a farmer is granted permission to use fire, volunteer squads provide assistance to ensure that it is a controlled burn.

Their decision to grant permission is based on whether it is safe at that time, according to a fire danger index. The index is a score from 1 to 100 that is calculated according to a measure of vegetation dryness, air temperature,

wind speed and humidity. Used worldwide, the global fire danger index was adapted to the Ghanaian environment and in the area is called the fire warning (*Egya Kɔkɔbɔ* in Twi, the common language in the area).

Through a WhatsApp group, weather conditions and the fire danger index are communicated every two hours to squad leaders by Form Ghana's operations centre. In turn, squad leaders post the index on fire notice signboards and spread the word, so the whole community is kept aware of the current situation and how it affects fire behaviour and fire risk.

In addition to the fire danger index, the fire notice board lists the squad leaders and fire volunteers, along with their telephone numbers. The board also displays instructions (in pictures) on what to do to get permission to burn and what to do in case of a wildfire.

Prevention, not suppression

There is no high-tech firefighting equipment available for suppressing wildland fires in rural Ghana, and water availability is limited in the dry season. Fire volunteers were trained in suppressing small to medium-size wildfires using hand tools such as beaters and rake hoes, but the programme focussed on prevention rather than suppression.

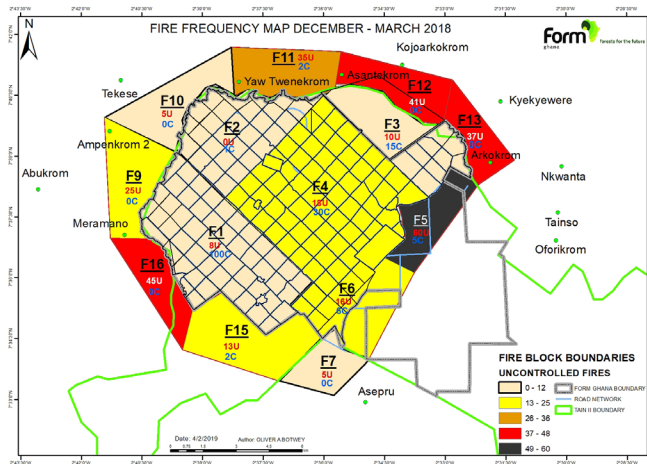
Community fire management plans aim to prevent fire outbreaks and limit their spread if a fire gets out of hand. Based on these plans, squads and farmers take

planned preventative measures. These include creating and clearing strategically located firebreaks to protect farms and villages, and widening roads so that they can also serve as firebreaks. In some cases community fire squads join forces to carry out well-managed burns early in the dry season in unmanaged areas around the forest reserve, or to prepare large defensive firebreaks to protect several villages.

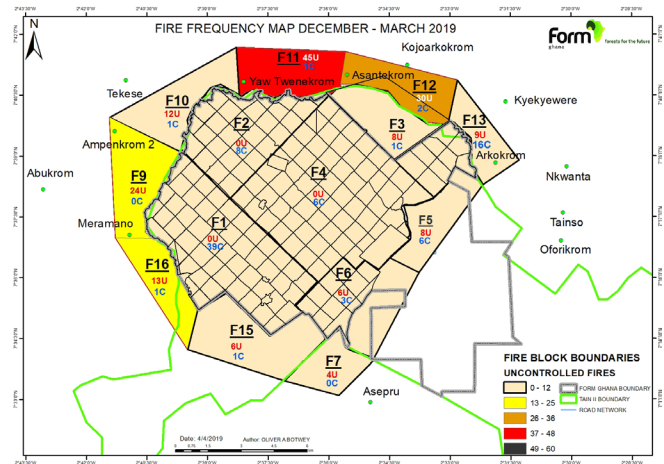
Impressive results

In 2021, after four years of implementing the community fire management project, the area under community fire management covered 6,150 hectares (ha), which helps to protect the 8,072-ha forest reserve. The number of wildfires in the total area was reduced by 78% compared to 2018 (Figure 1).

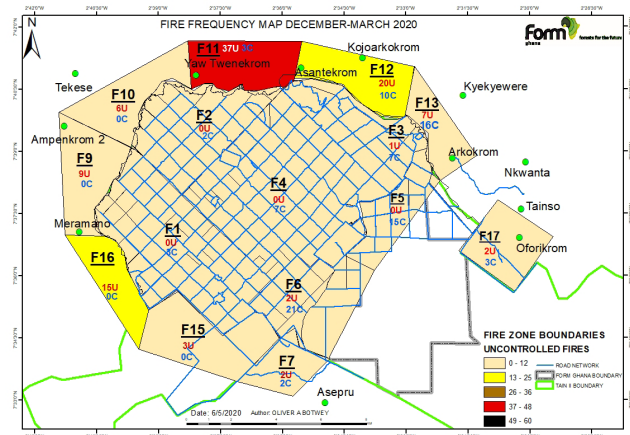
Communities have taken back control of the use of fire, with renewed skills and strengthened organization. This gives the 3,000 smallholders who farm in the programme area new confidence, as well as new economic opportunities from agroforestry. With less risk of fire, many farmers have planted cashew and mango trees in and around their fields that will provide valuable additional income in a few years, and are already having positive changes on the landscape. There is also a major positive environmental effect on the forest reserve, because the buffer zone around it is now permanently managed. Compared to using periodic fallows after annual crop cultivation, as was previously practised, farmers now see that it is worth the effort to protect their farms during the dry season.



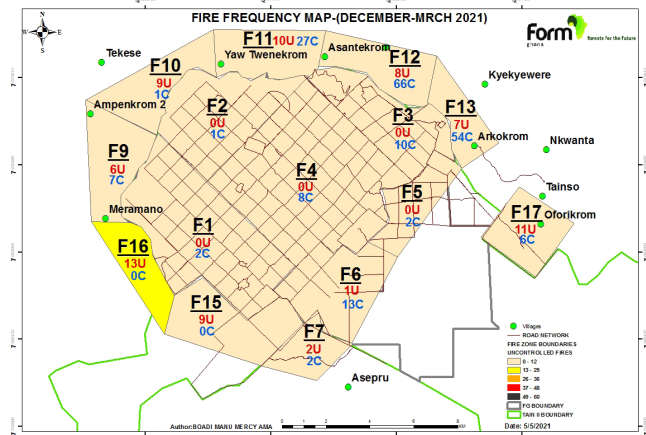
Map 1. Initial situation in 2018: 276 uncontrolled fires on community land around the Tain II Forest Reserve (green line represents the boundaries of the reserve).



Map 2. Situation in 2019: after one year with four operational community fire squads, the number of uncontrolled fire outbreaks was reduced by 78% compared to 2018 over an area of 2,647 hectares.



Map 3. Situation in 2020: after two years, with six operational community fire squads active on 4,845 hectares.



Map 4. Situation in 2021: after three years, with nine operational community fire squads active on 6,150 hectares.

Figure 1. The reduction in the number of wildfires in and around the Tain II Forest Reserve between 2018 and 2021. Darker colours indicate more uncontrolled dry season fires.



An equipped fire squad, ready for action. Photo: Melle Meivogel

These changes were summed up by Kwasi Asare, a farmer from Kotaa: “In the past, farmers of Kotaa used to plant cocoa trees underneath the large forest trees, but this changed over the past 20 years. I also stopped planting cocoa and grew maize instead because I did not want to risk that the trees get burnt during the dry season. But I dare to plant fruit trees again. Because of the fire squad of my village I do not need to worry, I can count on their assistance, and around our village there are far fewer uncontrolled fires than before. I now realize that when my neighbour’s farm burns, mine is in danger too, and we can only have flourishing farms when we work together.”

Form Ghana also sees the impacts of developing and implementing robust company fire management in its timber plantations, and how these impacts are complemented by the community efforts. The strong and trusting relationship that the company built with the neighbours over the years has been further strengthened, helping it to become even more embedded in the landscape. Form International is taking this approach to other landscape restoration programmes in Peru, Indonesia and elsewhere in Ghana. The approach developed here will be adapted to fit the local context and existing structures of these new areas.

Vast unmanaged areas of bushland, dominated by elephant grass, have been turned into diverse, productive and healthy farms with increased tree cover and perennial crops. Farmers in these areas say that it is now feasible to protect their farms from fire. The

well-functioning community system makes possible what in the past was not worth the risk. In fire-prone areas, community fire management provides a critical basis for joint landscape restoration initiatives that wish to stimulate tree planting, environmental conservation and development of agroforestry.

The most significant impact has been that local people took back responsibility and control over wildfires, which were their common enemy. Prior to the programme, community fire volunteers felt powerless. They are now proud and confident, since they are part of the solution to protect the lives and livelihoods of their neighbours. People now know that they are capable of making a large impact on a large scale.

Upscaling potential

The programme’s approach would likely lead to similar achievements if it were implemented in other communities and regions where forest and farming communities also suffer from annual wildfires. The key element for success is a community-based approach that focuses on fire prevention rather than suppression. The process has to begin with open and transparent discussions so that participants fully understand the challenges at the governmental, social, environmental and organizational levels. It must emphasize engagement, collaboration and unity between various groups, especially when revising bylaws, operating procedures and organizational structures. Any newly introduced techniques should complement traditional

practices and not replace them, in the same way that privately led activities should complement and not replace government programmes and initiatives.

In this case, the initiator of the programme was a private company that implemented activities alongside communities, traditional authorities, leaders and government institutions, including three regional departments of the Ghana National Fire Service. However, further scaling out this approach will require lobbying at the national policy level in order for the fire services to be allocated increased resources, and to support them to distribute these resources to their regional departments. In the meantime, other private companies could start by adapting and adopting this community fire management approach to protect their investments, with the full collaboration of the fire service, communities and traditional authorities.

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