

# FOREST /BUSH/ FIRE

## *Management Guideline*



June ,2020  
World Vision Ethiopia  
Addis Ababa



# Contents title

Introduction	1
Objective	2
Current Vulnerability of Forest to Fire Damage in	
RE- Greening Project Sites	3
Causes and types of forest fires	3
<i>Causes of forest fires</i>	3
<i>Types of forest fire</i>	4
Forest Fire Management (FFM)	6
<i>Fire Management Objectives:</i>	6
<i>Assets Threatened by fire</i>	6
<i>How to Manage forest fires</i>	6
<i>Actions Designed to Maintain the low fire danger</i>	7
Training fire crew	8
<i>Target for Training</i>	9
Detection and Reporting	9
<i>Provision of appropriate firefighting equipment:</i>	10
Awareness Creation and Capacity Building	11
<i>Fire Hazard reduction to reduce forest fire risks</i>	11
<i>Sil Vicultural Operation</i>	11
<i>Static Precaution</i>	12
<i>Fire pre-Suppression Activities</i>	12
Conclusion	13
	14



# INTRODUCTION

Wildfire in Ethiopia is typically fires that start out by people during farmland clearing or fire carelessly managed and went out of control during honey harvesting. Wildfires can also be termed as forest fires, grass fires and bush fires. Forest fire is disastrous for biodiversity including large trees and wild animal and may lead to extinction of those species of animal and plants. These fires can wipe out an entire forest and destroy almost every organic matter in the forest ecosystem if not timely controlled or carefully managed.

This guideline gives detail technical knowledge and skill on detecting causes and managing forest fires so that the biodiversity and ecosystem in the conservation areas of the re-greening project are saved. It includes technical methods of forest fire detection, prevention, suppression and elimination.

## OBJECTIVE:

The objective of this guideline is to equip field staff and partners with knowledge and skill of forest fires detection, protection, suppression and elimination so that risks of forest biodiversity and ecosystem loss is reduced.

## 1. CURRENT VULNERABILITY OF FOREST TO FIRE DAMAGE IN RE-GREENING PROJECT SITES

There were few historical cases recorded of forest fire outbreak and biodiversity and ecosystem destruction in the re-greening Africa project sites in the past. Currently, there are still some cases reported, where purposive forest fire happened by farmers clearing forest for farmland expansion and for elimination of wild animals that may attack their crop or livestock. However, current situation indicates that, there is no serious fire hazard that can cause forest fire in the project areas as the areas are highly degraded due to deforestation and over grazing. Though current situation indicates less fire hazard, it is obvious that tree cover will increase because of rehabilitation measures, there will increase vulnerability of forest to forest fire damage. Hence, equipping staff and partners with knowledge and skill of forest fire management is paramount. The preparation of this guideline is to address these critical gaps in forest fire management as it improves technical capacity of the staff and partners/stakeholders

and increases readiness for prevention. When field staff and partners have the knowledge and skill in forest fire management, they will support communities in fire crew formation, train them on technical fire management and equip them with necessary tools.

## 2. CAUSES AND TYPES OF FOREST FIRES

### 2.1 Cause of forest Fires

Sources of forest fire in the project sites are fires from surrounding farmland clearing, intentionally burning the existing bushes for farmland expansion and careless use of fire during honey harvesting. Fires set to forest/ bushes to chase wild animals that they believe may attack livestock and crop is another cause of forest fires. During the early periods, charcoal production was one of the causes of forest fire but since charcoal making is legally banned both by government decree and through creation of cooperative by-laws that are enforced by community guarding the forest, it is no more a serious issue.

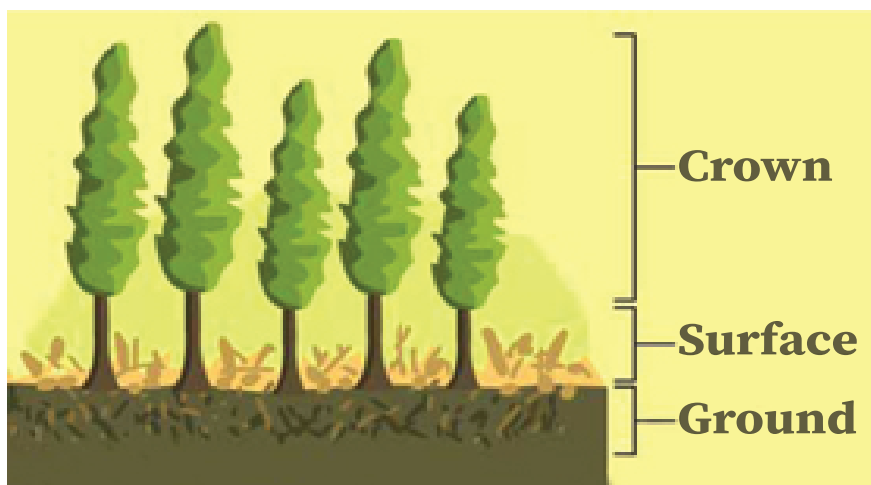
Three elements, fuel supply, oxygen and heat are essential for fire to spread. In the re-greening Africa project sites, currently there is minimum amount of natural fuel that could contribute to forest fire spread. This is because, the sites are highly degraded and there is less fire hazard. This means, the organic matter on the forest floor could not be the main cause for fire incidence, however, the rehabilitation process will increase forest cover and grass growth soon and this will increase vulnerability of the forest to fire. On the other hand, user groups

or cooperatives are guarding responsible for forest protection that they manage, control and prevent from damage and control forest fires by assigning group of their members on rotation basis as they are the owners of the rehabilitated forest area, user right granted by the government.

## 2.2 Types of Forest Fire

There are three kinds of forest fires. These are:

- Crown fire
- Surface fire and
- Ground fire







*Surface fire developing  
to crown fire*

**Crown fires** occur when fire enters the crowns of trees and spreads from tree top to tree top and spread very quickly with wind and heat. The trees burn with huge flames and the fire has intense heat and power to expand. Generally, crown fire is more destructive than surface fire because, sparks could fly over a wide area and cause fires to spread some considerable distance from the main outbreak.

**Surface fire:** This is the most common type of forest fire. In this case, dead grasses, pruned branches, dead trees laid on the ground and dry litter accumulated on the ground surface are considered as fire hazards. The fire burns all organic materials on the surface the forest ground. It may develop to ground or crown fire if not controlled timely.



*Surface fire with potential  
either grow to ground or  
crown fire*



*Surface fire developed to  
ground fire*

**Ground fire:** Fire that burns organic matter in the soil. This is developed from surface fire that burn over a long period in the forest surface. It may persist over long time and is liable to flare up and cause further fires in the area at any time until it is fully eliminated. This type of fire is difficult to manage because it might not be visible for fire fighters.

### 3. FOREST FIRE MANAGEMENT (FFM)

Fire management is the process of planning, preventing and fighting fires to protect people, personal properties and the forest resource. Hence, forest fire management is preventing fires to reduce their occurrence; detecting fires while they are small before they burn over large areas; suppressing fires in the forest before it expand to larger areas and eliminating the fire using fire crew and community members. Community participation in forest fire management is bringing responsibility for fire management closer to who benefit from the forest, the community. Thus, it is vital to include communities in planning and managing the forest.



*Ground fire growing to crown*

#### 3.1 Fire Management Objectives:

The objectives of forest fire management is to reduce forest, biodiversity and ecosystem damage, economic disruption and loss of life caused by wildfires through concerted actions and equipping stakeholders for the prevention and suppression of wildfires.

#### 3.2. Assets Threatened by Fire

The major assets threatened by forest fire are the forest trees, the carbon stock, biodiversity and ecosystem. Human and livestock are also susceptible to fire attack in the event of forest fire to the extent that they are physically present in the forest at the time of burning.

#### 3.3 How to Manage forest Fires



*Fighting forest fire*

Forest fire management is a technical method of fighting forest fire and should be included in the forest management plan (FMP). Forest fire management takes different actions, prevention, detection, suppression, and elimination to stop further progress of wildfires before it goes beyond control. If it goes beyond control, it damages all biodiversity and ecosystem that are very important for life. It is an integrated approach, which includes but not limited to the followings:

- ◆ Community participation in the process
- ◆ Fire prevention, fuel management primarily removal of fire hazards from the forest ground, fire break construction (clearing surface of strips within and around the forest block or a space from one end of the forest block to the other and remove all fire hazards to the soil)
- ◆ Fire pre-suppression (collection of fire intelligence, fire occurrence, time and condition of fire)
- ◆ Detection and early warning and reporting systems, fuel assessment, equipment, communications, water supplies and firefighting tool.
- ◆ Law enforcement, predominantly bylaw preparation by the community managing the forest in consultation with local authorities
- ◆ Training and public awareness on forest fire management and its impact on forest resources
- ◆ Organizing fire crew and provide training

### 3.4 Actions Designed to Maintain the low fire danger

Community involvement/ownership to natural resources is crucial for fire management. Providing communities with user right to the forest is the first and strongest line of defense against forest fire. By effectively making the forest a resource which belongs to the community, a very strong incentive for forest protection has been put in place. Forest cooperatives will enforce existing forest protection laws and their own by-laws that will set and implement penalties for offences. To this end, empowering the community through existing social courts within each Kebele Administration (KA) and granting of appropriate powers in cooperative leaders (CLs) are seen as options available in law enforcement.



*Forest fire elimination demonstration*

Fire related training need for officials of social courts should be assessed and training provided based on identified prerequisites. Local knowledge including detecting sources of fire and better ways to prevent their spread must be included in designing the forest management plan (FMP). Community members have lived in the area all their lives and already know where there is a serious possibility of fire starting points and entering the forest. All user group/cooperative members should be aware of the content of the forest fire management and the action they must take both to prevent and to extinguish fire once started.

Forest guards are members of cooperatives assigned on a rotational basis to protect the forest from intruders. They are also responsible to detect forest fire, try to suppress and call for support whenever it is

.going beyond their capacity to eliminate. Through training, they will be equipped with skill that will enable them to spot fire hazards and outbreaks and take action. In both instances, reporting system and action procedures will be prepared by the user group/cooperative in consultation with project staff and government sector offices. Each cooperative will assemble a trained and equipped community voluntary fire fighting crew of 8 to 12 members. Each crew will be trained in the basic techniques of fire fighting including backfire operations. All cooperative members will determine selection of firefighting crew members, lines of authority and responsibilities. Cooperative/user group leaders are responsible for directing the work of fire prevention. Community volunteer firefighting crews will be responsible for fighting fires and for mobilizing other cooperative members if they need support.

#### 4. TRAINING FIRE CREW

Training firefighter crew is very important before assignment as fire crew. Components of the training include orientation to forest fire, fire behavior, working with hand tools, fire line construction and working as team mates and equipment utilization. The followings key points should be included in the training content:



*Training on forest fire elimination*

- ◆ The correct use of fire beaters to extinguish surface fires
- ◆ Use of soil to extinguish burning stumps and logs
- ◆ Correct use of backpack pumps to extinguish burning stumps or branches
- ◆ Correct use of water to damp down vegetation along a fire line.
- ◆ Emergency repair to blocked pump jets
- ◆ Leadership role during firefighting
- ◆ Correct storage and access procedures for firefighting equipment, warning alarms/bells

#### 4.1 Target for Training

Target for training is recognized in all aspects of forest fire management after information and training needs have been identified. Posters warning of the dangers of fire will be displayed in prominent places for all

partners to understand the fire impact on forest ecosystem. Women's role in fire prevention and early warning is particularly noted and women's participation is sought in all training of fire management.

## 5. DETECTION AND REPORTING

Detection and reporting set procedures will be in place by cooperative members and make every member is well aware and reach consensus to sign the terms agreed as binding document. Forest guards are responsible for detecting and locating fires. If they are in the vicinity of the fire and the fire is still small, the guards may attempt to extinguish it. If the fire has already taken hold, one of the members of the guards will raise alarm using a clearly distinguishable whistle while the others begin suppressing the fire.



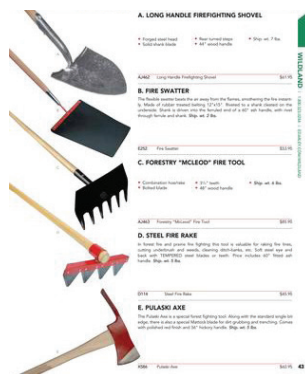
*Fire crew marching to fight fire*

When necessary, the team member raising the alarm will run or ride to the nearest point from where the village can hear the alarm. In the village, a bell placed at the KA office will be used to summon the community volunteer fire crew or the cooperative members as deem necessary to help suppress

the fire. On hearing the alarm, the community volunteer fire crew will gather immediately, collect their equipment, move to the fire and suppress it as soon as possible. If after arrival they find the fire has progressed too much, they will sound a second alarm, calling for assistance of the whole cooperative members.

## 5.1 Provison of Appropriate Firefighting Equipment:

The level of equipping of firefighting crews will depend on the degree of the hazard and the resourcing available. The communities should own resources such as shovels, hoes, rake, fire beater, helmet, bucket, fire extinguisher and axest hat will be called on where appropriate. All equipment required for fire protection duties will be purchased and existing equipment serviced one month before the onset of the dry season. Repair or replacement will be carried out in a timely fashion to ensure that equipment is fully operational during the main dry season. Fire pumps (if required) will be checked for wear of washers, reassembled, and tested at the same time. List of tools required for patrols and firefighting crews will be prepared and stored at agreed place. Tools may include backpack pump, slasher/ machete, whistles, 20 liter water containers, drinking water containers, first aid kits and more as deem necessary.





*Community discussion*

## 6. AWARENESS CREATION AND CAPACITY BUILDING

Awareness creation and capacity building activities must be undertaken for the cooperative members to recognize danger signs and take appropriate action in reducing fire hazards (fuel load on the forest floor) and in fighting fires.

### 6.1 Fire Hazard Reduction to Reduce forest Fire Risks

There will be discussions on fire management at the cooperative general assembly. Project and local level partners guide the discussion to address the importance and methods of preventing fire outbreaks, banning of charcoal making or burning in or near the forest perimeter.

Careful watching of fires that are lit in the open farmland and extinguishing them before leaving the area is mandatory to each inhabitant. Banning the use of fire in the forest or giving responsibility to bee keepers should be included in the bylaw. School children should have brief introduction to the danger of playing with fire, spotting fire hazards and environmental protection.

To reduce fire hazard, cooperative members will remove fire hazards in the form of excess natural fuels, grass, branches and leaves from the forest surface. Excessive fuel on farmland bordering the forest should be cleared as early as possible before the dry period of the year starts. Sometimes, for grass being fire hazard, grazing will be allowed in areas where trees are high enough to withstand damage from animals.



## 6.2 Silvicultural Operation

Timing of silvicultural operations that tends to increase fire hazard will be adjusted to avoid extreme fire risk periods. Lower branches will be pruned to half the height of the trees to improve tree growth, increase wood quality and reduce vulnerability of trees to crown fire. After tree pruning activities, the communities will take the pruning wastes for their personal use. These actions will greatly reduce the likelihood of surface fires, which in turn will diminish the chance of ground and crown fires outbreak. As grass and wood collection have economic value, (income generating, and meeting domestic needs), branches are incentives for community managing the forest.



## 6.3 Static precaution



*Forest road as  
firebreak*

Some static precautions such as road repair and construction of roads, contribute to fire management because it reduces fire spread to forest on the other side of the road. These activities will also increase fire fighters access and patrol ability in otherwise inaccessible areas.

Some static precautions such as preparing fire breaks of 2 – 3 meters wide, depending on the local assessment of risk and will be hoed on the inner edge of the external firebreak or slashed to the ground to avoid fire expansion.

Towers will be built at given points with a commanding view of the forest if need arise. There will be one or more towers per user group/cooperative, based on area size and topography; towers and lookout points will be manned only at certain times of the year. In order to keep



livestock out and wild animals in the forest, and to reduce the level of guarding required, cooperative members will plant living fences. Sisal and Euphorbia species are the live fence plants of choice and they are excellent firebreaks because of their low flammability. If required, plastic lined dams will be excavated in strategic places to capture rainy season water for possible use in the event of fire.

Activity substitution is needed from high fire risk activities such as charcoal making with low fire risk activities such as bee keeping and non-wood forest product collection (traditional medicines, fibre, spices, fruits and edible leaves). This will serve dual purpose, early income generation/additional diet and reducing fire risk.

#### 6.4 Fire pre-Suppression Activities

Up until project inception, the project sites have been ranked as low fire danger zones because of its minimal fire occurrence history, high human and livestock pressure which effectively reduced fire hazards, led to high level of land degradation and resultant bareland scape. However, due to project interventions, some of these conditions are expected to change. Since the extent of change and the potential impact of change are unknown, there will be a need for regular fire risk assessment.

Pre-suppression activities include appropriate fuel inventory, regular monitoring of fire risk indicators, fire risk mapping, fire-weather prediction, enlisting as many community members as possible to be the eyes and ears for fire information communication system.



*Firesuppression with water*

## CONCLUSION

The primary responsibility for protection of the forest from fires rests within the communities managing the forest. To this end, an enabling environment has to be created through the establishment of cooperatives and granting forest user right. Primarily, the fire management calls for actions which includes banning of fires and charcoal making in and near the vicinity of the forest, reduction in fuels (grass, branches, crop residues), and assignment of responsibilities for monitoring conditions, raising warnings and action to suppress fires and use of bylaw. All infrastructures, communication, base data, and other hard and soft ware that provide the inputs to an information and decision support system in fire management are vital. Secondly, as conditions are expected to change according to the seasons and along with the restoration of the forest and reestablishment of grasses, pre-suppression activities are included in fire intelligence gathering, detection and early warning and reporting systems, fuel assessment, training, extension and public awareness. Therefore, serious follow up and monitoring fire hazards and occurrence is highly recommended



World Vision Ethiopia

E-mail: [info\\_wv@wvi.org](mailto:info_wv@wvi.org)

AMCE-Bole Road, Bole Sub-City, Kebele 11, H. No. 518

P.O. Box 3330, Addis Ababa,

Tel. +251 629 33 50, Fax. +251 629 33 46



Funded by the European Union

