

FOREST FIRE MANAGEMENT PLAN

Humbo, Ethiopia Assisted Regeneration Project.

**By
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Fire Management Plan. Humbo Assisted Regeneration Project

1. Background

1.1 General:

The proposed activity is located in the Humbo Woreda, Wolayita zone, Southern Nations Nationalities and Peoples Region (SNNPR), South Western Ethiopia.



Figure 1 • Location of the proposed CDM activity - national

As for much of Ethiopia, uncontrolled population growth at the project area has created hunger for land mainly from rural communities. This has forced the people to clear forest for agriculture expansion, settlement, grazing and wood production, both for home use and marketing. The severe famine of 1984/85 aggravated the destruction of Humbo forest as a large proportion of the population cut trees for sale in order to buy food to survive. As a result, land degradation (soil loss by erosion), water depletion, loss of biodiversity and above all a severe shortage of wood for fuel and construction became common features of the project area. Deforestation continues to the present at an alarming rate. Currently only bushes and shrubs remain on the hills of Humbo Woreda.

Based on experience that shows degraded forests are restocked when there is genuine participation of local communities, the Humbo, Ethiopia Assisted Regeneration Project will facilitate protection and sustainable management of the remnant forest site through genuine participation of the communities living around the forest. It is believed that this will bring about rapid and significant change, including an increase in total biomass and biodiversity. Since the fate of forests are determined by human needs and interest, conditions of ownership and questions of empowerment are the decisive issues for sustainability of the resource. To this effect, the communities at Humbo site are organized into seven User Groups which have now been registered as seven legal cooperative

societies. Each cooperative group has elected its leader, the cooperative executive committees, credit sub committee, internal control/audit sub committee, forest management sub committee and forest protection sub committee. Significantly, the cooperatives have received User Right certificates from the government, thereby providing the communities with security, incentive to protect the forest and a sense of ownership. As a result of this, the cooperative societies have started the work of area closure and protection of the vegetation from intruders and livestock damage.

This project has been designed through community and local government participation with the objective of benefiting the global and local environment and the local community which manages the resource. The over all goals of the project are the sequestration of Carbon; the establishment of bio-diverse native forest and the alleviation of poverty in Humbo with flow of benefits in the areas of education, health and food security.

1.2 Description of the project area.

1.2.1 The forest

Approximately 2,728 hectares of degraded forest (Fig. 2) will be restored and sustainably managed by the communities surrounding the Humbo mountain range. Historically the project site was densely forested with different commercially valuable tree species, particularly when land was privately owned by land lords. At that time only land owners had the right to cut trees while others had to ask permission. The land proclamation act of 1975 left access to the resource open to the public. As a consequence trees were harvested for personal use and for sale and forests were cleared to make way for farmland.

The two specific biological communities that will be directly affected by the project are Ethiopian montane grassland and woodland, and Ethiopian montane forest¹. At present, all that remains is highly degraded forest on the hills where much of the vegetation is reduced to bushes and shrubs.

¹ These two biological communities and the threats they face have been detailed by the World Wildlife Fund, and can be found at www.worldwildlife.org.

Humidity is sometimes high due to cloud precipitation and local interactions between topography and weather. Unlike the moist equatorial mountains, the effects of cold descend further down on these dry highlands. Temperatures vary according to the season and elevation, but mean maxima lie between 18 and 24°C and mean minima are between 12 and 15°C

1.2.3 Surface Hydrology

Rainfall on the proposed project sites varies from 700-1000mm at Abella-Longena. The site is elevated and feeds a number of streams flowing to Lake Abaya. Due to the steep terrain and partly denuded soil, erosion can be locally severe, and heavy rains can cause flooding of villages and farms in areas below the project sites. In times of extreme rainfall, mudslides have occurred, and damage to roads, bridges and other infrastructure has resulted. In some cases lives have been lost. Of note for prevention and control of fires, streams only flow during and immediately after rains and there are no dams or natural lakes on the project site.

1.3 History and current vulnerability to fire

There is no history of out-of control fires in the Humbo mountain range despite exposure to dangers posed by charcoal making activities during the dry season. Historically the project area was utilized for grazing, fuel wood collection and charcoal production. The intense pressure on grass and wood resources resulted in severe land and vegetation degradation and the removal of fire hazards (fuel). Additionally, climatic conditions are relatively mild for much of the year (See climate description) with medium to high humidity, medium range temperatures and a biannual medium to high rainfall pattern. Thus there has been no occurrence of out-of-control fire and historically, fire risk is considered minimal in the project area.

Globally, many forest fires originate in agricultural and pastoral systems and in degraded vegetation which is outside of forests². The risk of this happening in Humbo is considered to be very low since communities do not practice burning of crop residues or burning of grassland to stimulate new grass growth. Fodder and fuel wood are in short supply and communities surrounding the forest area have learnt to be frugal in their use of these valuable materials.

² ITTO Guidelines on Fire Management in Tropical Forests. ITTO Policy Development Series No. 6.

However, there is a medium danger that fire Hazard³ may increase through the implementation of this project. With area closure, it is expected that grasses will re-establish and total biomass will increase along with leaf litter accumulation and dead branches on the ground. Traditionally communities do not have any organized measures in place to prevent and control forest fire. Hence a fire management plan is required to counter increased risk of fire.

2. Forest fires

2.1 Causes and behaviour of fire.

Three elements are essential for fire to spread: fuel supply, oxygen and heat. In the case of the Humbo project area, currently there is a minimal amount of natural fuel present as the forest is highly degraded and there are no branches or grass on the forest floor that could encourage incidence and spread of fire. Most likely sources of fire in the Humbo area are from charcoal making and fires from surrounding farmland and grazing areas. However, charcoal making has been banned both by local government decree and through creation of co-operative society by-laws. The by-laws are being enforced through forest guards after community consultation. And as mentioned, there is no widespread practice of crop residue or dry grass burning in the district.

There are three kinds of forest fires:

1. **Surface fire:** This is the most common type of forest fire in Ethiopia. In this case dead grasses, pruned branches, dead trees or felled trees and dry litter accumulated on the ground are considered as fire hazards.
2. **Ground fire:** organic matter in the soil may ignite and burn over a long period. It always starts as a result of surface fire passing over the area but 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 extinguished.
3. **Crown fire:** There occurs when fire enters the crowns of trees and spreads from crown to crown. 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.

These fire 'types' will be considered in the Fire Management Plan.

³ Fire Hazard is defined as a fuel complex, defined by volume, type, condition, arrangement, and location that determines the degree both of ease of ignition and of fire suppression difficulty.

3 Fire Management of Humbo forest.

3.1 Fire Management Plan Objective:

- to reduce damage, economic disruption, and loss of life caused by wildfires through concerted actions.
- to prepare stakeholder communities in the prevention and suppression of fires.

3.2 Assets threatened by fire

The major assets threatened in the case of fire are the forest trees and the carbon stock and biodiversity they represent. Human and livestock life may be threatened in the event of fire to the extent that they are physically present in the forest at the time. There are no permanent structures or farm lands within the forest area.

3.3 Degree of fire risk and fire history

There is no history of significant fires in the forest area and historically fire risk has been low. This will be monitored however as conditions are expected to change with project implementation.

3.4 Fire Management Plan (FMP)

A fire management plan is an essential component for the prevention, suppression, and management of fire within forests and adjacent lands. The Humbo Fire management plans will be part of an overall forestry plan.

The Humbo Fire Management Plan is aligned with Ethiopian national fire plan guidelines and the International Tropical Timber Organization guidelines. It provides an integrated approach which includes the following elements:

- Community participation in fire protection.
- Fire prevention (fuel management, fire breaks..)
- Fire pre-suppression (e.g. collection of fire intelligence,..)
- Detection and early warning and reporting systems, fuel assessment, equipment, communications, water supplies and training of fire fighters.
- Law enforcement and incentive systems
- Training, extension and public awareness programs

Due to the low Fire Danger Rating⁴ of Humbo, a two pronged approach is proposed:

- *Actions designed to maintain the low fire danger rating status of Humbo*
- *Fire Pre-suppression Activities*

3.4.1 *Actions designed to maintain the low fire danger rating status of Humbo*

low fire danger rating will be maintained by:

- Community involvement/ ownership of natural resources. The importance of broad-based support from all sectors of society, particularly civic organizations and groups is widely recognized⁵. Providing communities with user rights to the forest is the first and strongest line of defence 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. Cooperative societies will enforce existing government forestry protection laws and through their own by-laws, will set and implement penalties for offences. The flip side of incentives is enforcement. To this end, empowering the community through establishment of social courts within each PA and investment of appropriate powers in Cooperative society leaders are seen as options available in enforcement.
- Preparation of tailored fire management plans for each forest area/ cooperative society which will be revised each year based on previous experience and on current fire intelligence regarding changes to the fire danger rating. Local knowledge including likely sources of fire and best ways to prevent their spread, will be utilized in designing the FMP. Because community members have lived in the area all their lives, they will already know where there is a serious possibility of fire starting and entering the forest. All cooperative society members will be aware of the content of the plan and the action they must take both to prevent fire and to extinguish them once started.

⁴ Fire Danger Rating – a component of a fire management system that integrates the effects of selected fire danger factors into one or more qualitative or numerical indices of current protection needs.

⁵ ITTO Guidelines on Fire Management in Tropical Forests. ITTO Policy Development Series No. 6.

- Mobilization - forest guards are already assigned on a rotational basis to protect the forest from intruders. Through training, they will also be skilled to spot fire hazards and outbreaks. In both instances, reporting and action procedures will be prepared by the cooperative societies in consultation with WV project and Government Forestry Department staff. Each cooperative society will assemble a trained and equipped voluntary fire fighting crew. This will occur after consultation and at a point before the forest is deemed to have a medium to high fire danger rating. The forest management committees will be responsible for directing the work of fire prevention and control while fire fighting crews are responsible for fighting fires and for mobilizing other cooperative society members. Selection of fire fighting crew members, lines of authority and responsibilities will be determined in detail through consultation amongst all stakeholders.

As required, each cooperative society will assign a voluntary fire crew of 8-12 men to operate under a forest protection sub committee chair person. Each crew will be trained in the basic techniques of fire fighting including back fire operations.

Training will include:

- The correct use of 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 fire fighting.
- correct storage and access procedures for fire fighting equipment, warning alarms and rendezvous points.

- Detection and reporting

Set procedures will be in place for Patrol teams. Teams are responsible for detecting and locating fires. If they are in the vicinity of the fire and the fire is still small, the team may attempt to extinguish it. If the fire has already taken hold, one team member will raise the alarm whilst the others begin suppressing the fire.

- Fire suppression

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

- Provision of appropriate fire fighting equipment - The level of equipping of fire fighting crews will depend on the degree of the hazard and the resourcing available.
Upon agreement of the type of equipment required, the year two⁶ project budget will be modified to accommodate equipment purchase accordingly.
- 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 etc, reassembled and tested at the same time.
- List of tools required for patrols and fire fighting crews will be prepared and stored at agreed holding points. Tools may include back pack pump, panga, whistles, 20 litre water containers, hoes, wire beaters, drinking containers, fire aid kits, spades, axes.

- Awareness creation and capacity building activities - will be undertaken using participatory methods and enabling community members to recognize danger signs and take appropriate action in reducing fire hazards (fuel load) and in fighting fires. Children in schools will be educated on topics such as the danger of playing with fire, spotting fire hazards and environmental awareness. Discussions will be held at cooperative society general assemblies guided by project and Woreda government staff on the importance and methods of preventing fire outbreaks. Refresher workshops will be run each year at the onset of the dry season and cooperative society members will be reminded of their responsibilities regarding both fire prevention and suppression. Cooperative society managers at various levels will be particularly targeted for training 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 and explained.
Women's role in fire prevention and early warning is particularly noted and women's participation is sought in all training and on fire management committees.

⁶ No serious fire danger is envisaged in year one of project activities because of the low incidence of fire hazards in the area.

- Promotion and enforcement of fire prevention activities – such as banning of charcoal making or burning in or near the forest perimeter; careful watching of fires that are lit in the open and extinguishing them before leaving the area; banning the use of fire in the forest. Boundaries will be determined and marked to ensure clear separation of management regimes.
- fire hazard reduction – to avoid surface fires, cooperative society members will remove fire hazards in the form of excess natural fuels. Excessive fuel on farmland bordering the forest will be cleared in the dry season; cut and carry management of grasses in forests will be practiced as early as possible in the dry season and where livestock are excluded. Grazing will be allowed in areas where trees are high enough to withstand damage from animals.

Timing of silvicultural operations which tend to increase fire hazard will be adjusted to avoid extreme fire risk periods. After annual tree pruning activities, the communities will remove the pruning wastes for their personal or communal use. Lower branches will be pruned to half the height of the trees. Community selected monitors (Community Development workers) will be present during communal forest activities to give instruction, monitor activities and report infringements. These actions will greatly reduce the likelihood of surface fires, which in turn will diminish the likelihood of ground and crown fires. As grass and wood collection are economic activities (income generating, and meeting domestic needs) there will be no need to provide incentives for these activities.

- Static precautions – some static precautions such as road repair and construction of roads and bridges (which double up as fire breaks) are already included in the current budget. These activities will increase fire fighters access and patrol ability in otherwise inaccessible areas. Existing roads make very satisfactory breaks particularly on external boundaries of the forests. Some static precautions such as preparing fire breaks⁷ and the construction of fire lookouts will be instituted only when warranted by agreed fire danger ratings and will follow standard procedures (e.g. clearing of fire breaks and fire lines to commence as soon as a dry period approaches; external fire breaks to be slashed and while still green

⁷ Any natural or constructed discontinuity in a fuelbed utilized to segregate, stop, and control the spread of fire, or to provide a control line from which to suppress a fire; characterized by complete lack of combustibles down to mineral soil (as distinguished from fuel break).

the trash is to be removed from the area; fire lines are to be 2 – 3 meters wide, depending on the local assessment of risk and will be hoed on the inner edge of the external fire break.

- If required, towers will be established at given points with a commanding view of the forest; there will be one or more towers per user group, based on area size and topography; towers and lookout points will be manned only at certain times of the year. Existing natural fire breaks e.g. along stream banks or valley bottoms or open strips along ridge tops will be retained. If and when required, as determined by the Fire Danger Rating, Fire Lines⁸ will be prepared. Fire Danger Ratings will be determined annually. 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 in Humbo and they are excellent as fire breaks 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 – high fire risk activities such as charcoal making will be substituted with low fire risk activities such as bee keeping and non wood forest product collection (traditional medicines, fibre, spices, fruits and edible leaves etc).

3.4.2 Fire Pre-Suppression activities.

Up until project inception the Humbo mountain range has been ranked as having low fire danger rating because of its fire free history, relatively mild climatic conditions, high human and livestock pressure which effectively reducing fire hazards, high level of land degradation and resultant bare ground surfaces. 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 assessments and intelligence gathering.

Pre-Suppression activities include -

⁸ A more intensively cleared line 2 – 3m, often cleared within firebreaks to improve the protection offered by the break against ground or surface fires.

- Annual fire risk assessments and designating a Fire Danger rating
- Appropriate Fire intelligence ⁹ systems in place, including maintaining a 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 an intelligence system. Intelligence is critical, not only for successful prevention and fighting of fires, but is required in order to make sound management decisions which are appropriate to the specific Humbo context. Rather than being haphazard on the one hand or prescriptive on the other, expenditure of time and funds will be based on intelligence gathering so as to ensure optimum use of these scarce resources.

4. Conclusion

The primary responsibility for protection of the Humbo forest from fires rests with the communities surrounding it. To this end, an enabling environment has been created through the establishment of seven cooperative societies and through the granting of forest user rights.

A two pronged approach to protection from fires and suppression of fires has been applied in the Humbo, Ethiopia Assisted Reforestation Project.

Primarily, the FMP calls for actions which will maintain the current low fire rating status of the Humbo forest. These actions include incorporation of appropriate clauses in the Cooperative society by-laws, including 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. Etc. Allowance is made for the formation and training of fire patrol groups, purchase of appropriate equipment, building of watch towers and plastic lined dams according to fire risk assessments.

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 the fire management plan. These include fire intelligence gathering, detection and early warning and reporting systems, fuel assessment, training, extension and public awareness. Fire intelligence will inform the planning and annual fire management plan review process.

⁹ All infrastructures, communication, base data, and other hard and software that provide the inputs to an information and decision support system in fire management.