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## Wildfire in African forests; untold causes and visible effects of climate change

📍 africa, Climate change, Ethiopia, wildfire

This article presented under technical and financial support of Africa 21 <http://www.africa21.org/>

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### Wildfire in African forests; untold causes and visible effects of climate change

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According to Bond and van Wilgen, **"Africa is referred to as the Fire Continent, implying the widespread occurrence of fire in the region."** In the same token, Demel Teketay said that "although the cycle of events that leads to the destruction of forest resources in Ethiopia involves many varying factors, those initiated by humans using fire to access and remove forest resources is becoming the most severe these days."

Kinfe Abebe also said that "fire has been responsible for the disappearance of forest from the northern parts of the country. However, in Amhara Region and Benishangul Gumuz Regional State the first phase of wild fire starts at the mid October and ranges for about three months and the second phase start at the month of February and stays to the month of May."

Ethiopia is the second-largest population in Africa, with limited capacity to manage natural resources, and widespread land degradation. The country also faces many serious challenges to conserve its biodiversity and forests. In combination with its importance as a center of genetic and agricultural diversity, conservation of water, forest and biodiversity is an issue of global importance.

During my field observation and discussion with expertise and local communities "significant amount of resources have been destructed, for example 1140ha bamboo forests and more than 9800 ha community managed forest were burnt in December 2014-December 2020, 3259 goats were burnt and more over 1210 settlement houses were burnt in Arenda and yjadeya kebele in November 2015- November 2020."



Western part of benishangule Ethiopia

The Amhara and Benishangule regions are one of the poorest and most food insecure regions in Ethiopia. The incidence of poverty in the region is 54% (MOFED, 2020) and 93.2% of the population depend on shifting-cultivation agriculture for income. Additional livelihood options include livestock rearing, gathering wild foods, fishing, honey production, traditional gold mining, hunting, handicrafts, and charcoal-making.

The region has vast bamboo resources which could provide the raw materials for income-generating businesses. Bamboo has been shown to be an excellent source of of farm income in many developing countries and could be equally effective here.

Benishangul-Gumuz has 440, 000 hectares of Shimal bamboo (*Oxytenanthera abyssinica*) which at present is mainly used for subsistence uses such as housing, fencing, kitchen utensils, and agricultural implements and shoots for food. Some people earn a small income by selling bamboo poles to people in Awassa for use in traditional houses, and by selling small pieces of poles as fuel wood.

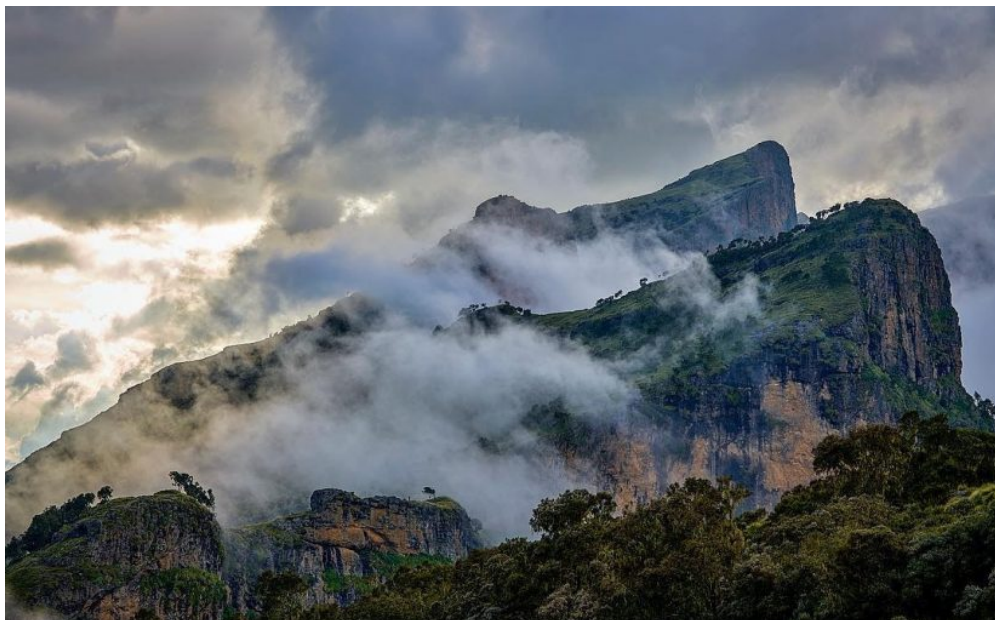
Yet the rate of deforestation and forest degradation is alarmingly high due to overexploitation, overgrazing, expansion of cultivation and settlements that are accompanied by excessive deforestations, invasions of alien species and pollution.

According to Benishangul-Gumuz Regional Food Security Strategy Report (BGRFSSR), degradation of forest resources is increasing at an alarming rate due to various factors such as encroachment, forest fires, absence of secure land use policy, effects of agricultural expansion and intensive resettlement programs (BGRFSSR, 2020). Lack of equitable access to natural resources and, hence, inequitable distribution of their benefits often leads to clandestine encroachment, resource use conflict and misappropriation of these resources.

## Fire Continent in the forest

Fire is a dominant ecological disturbance in almost all vegetation zones in the world, second to human activities related to urban living and agriculture production. Fire in most ecosystems is considered as an

essential and ecologically significant phenomenon that organize both physical and biological attributes, shape life forms and biodiversity, and affect energy flow including carbon cycle. Fire is one of the age-old tools used to manage land resources by different communities in the world



Fire in the national park of Ethiopia

## Elements of a Fire

Within every fire event, there are three elements (known as the fire triangle) that interact to ignite flames.

- The first of these is heat, which is required for fire ignition. Heat is essential to fires because it removes moisture from fuel and warms the air, allowing the fire to follow an unobstructed path. In wild land fires, the natural heat and ignition source is mainly lightning but people can contribute via such things like campfires.

Fuel is the second element of fire and is characterized as any combustible material. In wild land fires, fuel consists of vegetation; different types of vegetation have different fuel characteristics. Some plants, for example, contain resins or oils that cause them to burn more easily and more intensely than others. Dead plant biomass like leaves is also an important source of fuel for wild land fires. In addition, the drier and more closely spaced the fuel is, the easier it burns. Topography also plays a role in a fire's fuel as they cannot spread if there are large natural breaks in vegetation such as lakes, ridges, or rivers.

Oxygen is the third component of the fire triangle because it supports the chemical processes that take place during a fire. As fuel like leaves burn for example, it reacts with the oxygen in the surrounding air and releases heat, which allows fires to grow and rapidly spread.

In addition to the elements found in the fire triangle, spread and intensity are two important components of wild land fires. The rate of spread is the distance a fire travels during a given amount of time. Fires spread via the advance of the burning front (the front line of fire's movement) but also through the ignition of spot fires by flying embers.

Wild land fire intensity is based on the fire's heat and impact on the area's vegetation. Surface fires for example are low-intensity and burn only ground vegetation while leaving trees intact. Crown or canopy fires are the hottest and most intense wild land fires and can destroy entire forests.

## Wild land Fire Geography

Since topography and vegetation structure play a large role in the development of wild land fires so too does geography and **latitude**. For example, areas in the subtropical region often feature grasslands that have low topographic relief, are dry, have low humidity, high temperatures, high winds, and lightning. Due to these factors, portions of subtropical areas like Africa, Australia, and South America experience frequent, large wild land fires.

By contrast, the arctic tundra features a topography with lakes and rivers and has small shrub vegetation. In addition the area's climate is cold, moist, and has few thunderstorms so it experiences few large wild land fires.

## Natural Wild land Fires and Plant Adaptations

Natural wild land fires are mainly caused by lightning. Because certain geographic locations experience frequent lightning storms, over time ecosystems in such areas developed to include fire as a natural component and plants have different adaptations that allow them to survive or reproduce during wild land fires. Pines for example have serotinous cones which remain closed and hold in their seeds. When heated by fire, they open and release the seeds, allowing new trees to reproduce post-fire.

Some trees such as sequoias and redwoods have also developed thick fire retardant bark. Because such bark is a poor conductor of heat, these trees can withstand extreme temperatures and survive wild land fires. In addition, these types of trees also normally have high branches so surface and ground fires cannot reach their tops.

Finally, areas prone to natural wild land fires can benefit from fire in that it destroys harmful bacteria and fungi on the ground that can harm seeds before germination and recycles nutrients in the humus layer upon burning.

## Human Impacts on Wild land Fires

Today, about four out of five wild land fires are caused by people. More importantly, humans have impacted wild land fires through fire suppression. With fire suppression, ecosystems adapted to fire have suffered, because the lack of natural fires reduces clearance of dry brush, causing fires to become more severe when they do start.

This is because people are moving into undeveloped areas and causing fires but also because fire suppression has increased the amount of fuel. With more fuel, fires become more intense, burn hotter, and turn into canopy fires as high brush (called ladder fuel) allows fire to climb high into trees. Because such fires are more intense, it is more difficult to put them out and firefighters often have to wait until burning front runs out of fuel, causing more acres to burn.

To prevent these intense fires, many agencies are now using controlled burns to clear out brush and re-establish small wild land fires as a natural part of forests and grasslands. Additionally, various governmental entities require property owners to clear a certain amount of brush or forest away from their homes as a defensible fire protection space.

## Fighting Wildfire

Fighting uncontrolled wild land fire is extremely complex and potentially very dangerous. Understanding how fires are fought, how fires are managed and the usefulness of fire in the wild is critical to dealing with wildfire.

## Prescribed Fire in the Forest

Change by fire is biologically necessary to maintain many healthy forest ecosystems and fire-loving plant communities. Forest resource managers have learned to use fire to cause changes in plant communities. Smokey Bear came to us by necessity. World War II started a wildfire fear from enemy sources. That enemy

did not materialize but the wildfire issue did. It took a decade to decide on just the right poster animal to use and the perfect wildfire campaign to present to the public, and animal communities to recreate the way fire was used before the European migration.

## Unregulated forest fire

Undoubtedly, this has been one of the major degrading agent in the basin areas. According to :

- wild honey hunting;
- site clearance for shifting cultivation and cropland preparation;
- Road clearance for gum and incense tapping; defense against wild animals, and trophy hunting.

As there is no or weak systematic burning and fire control mechanism, fires consume huge areas of land including unintended areas. Consequently, fire has been consuming huge areas of natural land every year. On average, 1 percent of all forests were reported to be significantly affected each year by forest fires (FAO, 2011). However, the area of forest affected by fires was severely underreported, with information missing from the data areas. As it has been seen from photo peoples and investors intentionally set fire in *Dangur district and Semine National Park* affecting the ecosystem and economically important trees. Specifically, the lowland bamboo is one of the highly victimized economic trees in the basin.

## Causes of wild fires

- **Careless and deliberate activities**
  - To clear farmlands
  - To get rid of wild animals
  - To induce new re-growth of grasses for pasture and controlling disease vectors
  - fast fire is used as a tool to control heavy weed infestation and to get access and good sights
  - Due to the economic value of charcoal and the relative ease with which it can be produced, it is an extremely attractive source of income for poor community members in rural areas with road networks ensuring marketing
  - Traditionally honey is collected from grooved trunks of trees or from local bee hives that are long, cylindrical objects hung high in trees
  - Cigarette smokers
  - cooking with traditional stone fires in open places
- **Politically affiliated activities**

Social and political factors are possible causes of wild fires. In nearly every discussion on wild fires and overall forest management, the intertwined and complex relationships between government, land and people in Ethiopia were mentioned. The most important social and political factors influencing forest management and fire prevention are the current land tenure system and land ownership, ethnic and politically based conflicts, illegal settlement, legal and illegal commercial exploitations.

- **Ethnic and politically based conflicts and wild fires**

Wild fires can be started as a means to chase away armed opposition groups hiding in

Impenetrable forests. This tactic is commonly employed in a number of countries at war, but for Ethiopia also evidence so far has been established to support this argument of negative forest management. The local communities who do not disclose their name because of the political sensitive nature of information. For this reasons, government officials and farmers alike were reluctant to provide any politically sensitive information concerning forest fires. But, in the informal interview the community confirmed me the it is the guerilla armed struggle in the forest is very dangerous one next to the investors demand the land.

- **Illegal settlements**

People in rural areas – and illegal migrants in particular – consider forests to be free,

unoccupied areas and settle there to grow crops. It is likely that the number of illegal and unofficial settlements has been rapidly increasing, particularly since 1995. Apparently, government officials at all levels are aware of the illegal settlement problem but are unable to act and to stop the process. Migrants usually negotiate with local government officials and then build small huts as a holding and to mark land utilization. Migrant and local populations usually disagree on land and tree management in the sense that the local population utilizes natural resources in a more sustainable way than their migrant neighbors.

## Fire appraisal and management

The assessment of fire management results indicate that there are no responsible institutions or forest fire fighting team established either at the peasant association (PA), district or zonal level before and after the fire incidence at all places, implying the approach was reactive than being proactive. In this case, the first central problem mentioned Mr Alemayehu who is chief of local communities said that, “the late response of the local administration and local communities to the campaign. The rugged and dissected terrain which makes access difficult is mentioned as one of the major problems.”

Tesfaye has also witnessed that the participation of the local communities to fight against the fire is very much limited at Benishangul Gumuz Regional State, compared to people who came from other places. “Fire fighters had to walk for several hours, from two to three hours on foot to reach the fire fronts and were already exhausted by the time they arrived at the site. A critical shortage of fire fighting tools, lack of know-how on how to fight fires, mainly that of crown fire, poorly organized way of resource mobilization, late response of the local communities and administration were identified as the major problems encountered at fire fronts”.

### *Controlling Forest Fire*

According to the people in Benishangul Gumuz Region particularly the Gumuz societies chief local administrator Mr Bekalu “cultural practice is shifting cultivation in which fire is an essential tool to clear forest. It is related with their day to day livelihood activities.” Therefore their word recommends that fire control strategy or regulation is needed. However, The zonal agricultural and environmental protection expert Ms Tsehay argue that “it is difficult to change the deep rooted cultural practice of the Gumuz and other native ethnic peoples of the region. Hence, continuous training with full participation and commitment of government bodies and stake holders is needed on fire ecology and control mechanisms.”

The community practice firing the natural vegetation twice a year that prolongs from October to April/May according to the information obtained from Zonal and Woreda government officials. The main wild firing peak months are November, December, February and March. The main causes of wild firing are the following: Wild honey harvesting, Hunting, Incense harvesting, Cowboys to control the cattle at a distance, To cook wild potato ( aecho), Agricultural expansion, Gold mining, Wild fire from neighboring country (Sudan), Rural road construction, To protect animals from reptiles attack, Cigarette, To reduce animal disease (trpanosomia) causing flies in lowland areas.

During our field observation and discussion with expertise and local communities one or more of the above reasons significant amount of resources have been destructed, for example 1140ha bamboo forests and more than 9800 ha community managed forest were burnt in December 2014-December 2020, 3259 goats were burnt and more over 1210 settlement houses were burnt in Arenda and yjadeya kebele in November 2015- November 2020.

### ■ Large scale investment

The government report revealed that in Benishangul-Gumuz region about 691,984 hectors of agricultural land has been transferred to the Federal land bank to undertake large scale agricultural investment. Mr Dessalegn researchers in Ethiopia associate the situation with the so called “global land grabbing”. Land grabbing is the rush for commercial land in Africa and elsewhere by private and sovereign investors for the production and export of food crops as well as bio-fuels, in which the land deals involved stand to benefit the investors at the expense of host countries and their populations.

According to Mr Tsegaye in Beneishangule Gumuze Regional state investment expert confirmed that “a substantial amount of land has been transferred to domestic and foreign investors without mapping of existing land uses. Moreover, he identifies that the land transferring process lacks genuine participation of local communities and authorities. In consequence, these the dispossession and displacement of

communities from their villages and destruction of the natural environment threatened the livelihoods of the local people."

Mr Maru suggests that "there is weak linkage, monitoring and support from federal, regional and district levels in relation to large scale agricultural investment activities. Moreover, weak capacity of domestic investors has accelerated degradation of forest resources, and threatened livelihood security of rural community."

During our preliminary filed survey in the region it has been realized that different large-scale development projects have been undertaken by private investors with the view of promoting regional development. In connection with rich version land and suitable for land for private and public investment, Massive large scale investment has been undertaking in the region. During the discussion with the residents of Guba woreda large scale investors are engaged in destructing economically important tree species. When the local people and *kebele* leaders request the project owners to pay attention to environmental issues, the investors often fail to do so. Secondary data revealed that wide area of the Nile basin's virgin land is allotted for investment purpose, however most investors are:-

- in Lack of commitment on rehabilitation of degraded forest lands and tree plantation side by side with improving the management of natural forest, rehabilitation of degraded lands through soil and water conservation, tree planting, area enclosure and other relevant techniques is an important action to contribute to improve natural resources management in the region. However, by planting trees on degrading lands, further pressure on the natural vegetation can significantly be reduced. Therefore, tree planting needs to be considered seriously as strategy to reduce pressure on natural resources base.

Wild fire is practicing commonly in all of the three administrative Zones of the region. According to the information obtained from the community assessment deliberate and uncontrolled wild firing occur in Metekel zone followed by Assossa and Kemashi Zones in order.

**The main Effects of wild firing are now visible "Loss of bamboo forests and community managed forest; Loss of animals in forest fire burns; Loss of settlement houses in local villages; Loss of biodiversity; Exacerbation of soil erosion; Deforestation; Destruction of aesthetic values and recreational opportunities; Migration of wild animals; Drying of streams; Affect weather pattern and local area temperature rise; Ecosystem destruction and fragmentation Forest coverage trend in Metekel Zone**

The assessment attempts to show the trend of forest coverage in Benishangul Gumuz region. Metekel Zone forest coverage of four years data shows that the trend of the forest coverage of the Zone is dwindling from year to year as it is indicated in Figure.

But the forest coverage of Assosa and Kemashi zones are not well identified and we were not able to get the desired data from recognized organizations. Even though, the crude information shows that in Assosa and Kamashi zones similar way of forest coverage trend may happen.

To reduce the practice of wild firing in the region different options have been undertaking starting from two years ago. The efforts are made by the regional Government and NGOs in collaboration with the local

farmers. The measures taken to reduce wild firing are;

Preparation of wild firing controlling coalition document;

Establishments of wild firing controlling committee at the Regional up to local level

- Awareness creation to the community representatives and provide training about the construction of fire breaks
- Construction of fire breaks in severe areas

A wild fire caused by cross boundary fire.



Africa continent also affected by wildfire more than Amazon

As Federal Democratic Republic of Ethiopia Nile Basin Authority team took the above picture during on site observation of the *Mankush* mountain forest while it was coming under fire and sustained until the fire has completely invaded the forest causing more acres to burn and destructing biomass. The interview with the local community indicated that

"the wildfire was arose from the *Almehal* forest/Sudan border/ and reached near Guba woreda center/Mankush town/ after more than eight days of travel and along more than 50km distance. No one was in place and interested to extinguish and control the fire during the incidence rather it is let destruct further despite the fact that the wild fire protection brigade is said to be organized at different administrative levels. It is not difficult to imagine how much biomass is destroyed when dense and huge areas of forest set fired in the absence of natural and/or artificial fire breaks.

#### ***Impact of wild fire on the cattle feed and shelter in Guba woreda.***

Due to the combination of underdevelopment and dependence on subsistence

Agriculture, fire is an integral part of daily life. Fire is one of the most important tools used by people in rural communities to impact the land around them. Because Ethiopia's forest fires are primarily human in origin, the prevention of future fires is a difficult, daunting task. Fires will continue to burn the precious remaining forests unless there is a fundamental and dramatic change in the way people relate to the land, in the way the government manages and protects it.

Wild firing in Benishangul Gumuz Region is widely practiced by the communities. This activity is highly deep-rooted to life of the rural community. Firing of the natural forest takes place in all parts of the region but it is severe in lowland areas of the Region that bordered with Sudan. The community executes the practice more deliberately to protect themselves from reptile attack, for hunting and agricultural land clearing. The phenomenon is causing significant loss of biodiversity and complete damage of shelters of the rural community.

Understanding the problems associated with fires – and the problems that arose as a result of fires – requires the incorporation of sensitivity to the discrepancy between expert and grass root perspectives. Sustainable solutions must focus on improving the quality of life for those who interact most with the land,

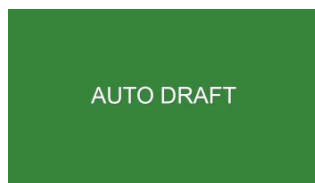
which means giving attention to the interests of farmers and rural communities. In conclusion the wild fire fighting will involve the allocation of adequate finance and skilled manpower to bring settlement and attitudinal change of the community.

- Construct firebreaks and roads to prevent the expansion of wild fire so as to save biodiversity loss and ensure the rural settlers safety. Because they provide routes to transport fire fighters or quick evacuation of life forms and goods if a fire blows up beyond the control of the workers.
  - Undertake resettlement of the sparsely scattered community residences and construct adequate fire breaks in villages
  - Provide significant administrative support to the woreda so as to prevent wild firing effectively
  - Build the capacity of the lower administrative organ of the government and equip with the necessary fire prevention facilities and provide awareness creation programs to the lower levels of the government administrative organs and to the community.
  - Allocate adequate budget for the operation of fire break construction and community awareness
  - Negotiate with neighboring Sudan to cooperate to prevent wild fires at the border.
- 
- Strengthen modern land use and forest management system of the region.
  - Strengthen traditional systems of natural resource governance.
  - Introduce alternative energy technologies to slowdown deforestation, because of forest products such as charcoals are consumed as energy sources especially in urban dwellers.
  - Create enabling environment to bring the laws and regulations applicable in replanting to replace the destroyed forest due to large scale investment.

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