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## World Approaching Extinction: Bio-diversities, Human Security and the Amazon Rainforest Wildfires

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### *Abstract*

*Fire outbreaks have long played an important role in the formation of vegetation types in the Amazonia where the high moisture contents and dense canopies have historically made the Amazon rainforest extremely resistant to fire spread. However, the fires of 2019, which caused massive deforestation, have left the Amazon rainforest massively depleted of its biodiversity. While scholars have examined the propensity for the fire to spread, there is scanty literature on the long-term human security consequences of the fire on the environment and on humans.*

*The fires were largely triggered by anthropogenic causes but spread as a result of climate change. In addition, the political dynamics of Brazil has accommodated and promoted agricultural and mining practices, which exacerbated and sustained the fire. The direct and indirect effects of the fire include loss of vegetation, loss of biodiversity, reduction in carbon stocks of the forest with potential consequences for global carbon cycle, eco-imbalance and threat to human security. To find a viable long-term solution to deforestation and achieve sustainable development in the Amazon, the underlying causes of the fires must be addressed. Affirmative actions are needed to be taken at both national and international levels while sensitization drive on the human insecurity consequences of forest fires must be pushed.*

**Keywords:** Amazon fires, Loss of biodiversity, Deforestation, Human security

### Nature's Carbon sinks

The Amazon Rainforest has been described as the largest forest on earth by scholars such as Stewart (2019). The forest has seen its own fair share of burnings year in year out; however, the 2019 fires experienced in the forest is seen as the largest yet in history. Opinion writers and environmental conservationist have expressed despair over the perceived silence which accompanied the event. Thousands of trees which have been standing for years have been widely destroyed, while the various animals in the wild died in their hordes. The Amazon River isn't left out from the effect of the destruction. Aquatic animals such as crocodiles haven't been spared and the aerial view of the damage has shown the scale of the widespread destruction.

Destruction of the Amazon forest will have an adverse effect on the world climate and everyone on earth will be affected. Despite the fact that the Amazon forest is situated largely in Brazil, the global warming effect will not be felt by the Brazilians or the people of the South American continent alone, rather, it will be felt all over the world. Rosen (2019) stated that the fires are so widespread and intense that the smoke from the fire wafted thousands of miles away to the Brazilian city, Sao Paulo, which is about 3,000km away from the Amazon rainforest. This resulted in foggy atmosphere in Brazil's most populous city. The National Airspace Management Authority (NASA) report of 2019 confirmed that apart from satellite imagery

showing the extent of the fire, the smoke from the fires was clearly visible from space.

The Amazon rainforest is an ecological marvel. The rainforest is otherwise called the 'lungs of the world' and is made up of 670 million hectares (1.7 billion acres; 6.7 million km<sup>2</sup>; 2.6 million sq miles) of rainforest (D'Amore, 2019). The name is attached to the forest due to the fact that the forest alone supplies an estimated 20% of the world's Oxygen while housing approximately 10% of the world's animal and plant species. Added to that, it acts as a massive carbon sink of the world by absorbing massive carbon dioxide into the earth's soil (Mufson & Freedman, 2019). The immediate environmental effect of the fire will be the reduction in oxygen being supplied from the forest as well as the reduction of the carbon dioxide absorbing quality of the soil. Thus, the carbon dioxide which has been absorbed for more than a decade would be released into the atmosphere. According to the World Wildlife Fund (2019), the size of the Amazon is touted to be twice the size of India and it's said to be undoubtedly the largest remaining tropical rainforest in today's world. Furthermore, the forest is the home to about 10% of the world's biodiversity (Stewart, 2019). Similarly, it produces approximately 20% of the world's oxygen thus, helping to regulate the temperature of the whole planet (Mufson, & Freedman, 2019). Climate change advocates

state that without the Amazon forest, climate change effects could become irreversible.

The Amazon is the largest tropical rainforest in the world and it covers over five and a half million square kilometres which is about 1.4 billion acres (Pavid, 2019). A very large chunk, more than half, of the rainforest is situated in Brazil. The other parts of the forest are located in other South American countries which includes Peru, Ecuador, Venezuela, French Guiana, Colombia, Bolivia, Guyana and Suriname. Ecosystem wise, 10% of the world's recognized species, 20% of bird species in the world and about two million, five hundred thousand different species of insect as well as over forty thousand and one (40,001) plant species are all housed in the forest (Schwartz, 2015). Furthermore, an identifiable number of dangerous species, as so classified, live in the rainforest. These includes animals such as the Anaconda, Cougar and Jaguar. The protection of the Amazon rainforest has thus, remained a burning issue in world politics and among conservationist. Hence, the rate of deforestation has been reduced and the areas of conserved land have steadily increased over the last 10 years. In both 2005 and 2010 the Amazon rainforest suffered severe droughts that killed off large amounts of vegetation. According to Rosen (2019), this was in line with a study by Climate change expert that suggests that a 3°C rise in world temperatures by the year 2010 would destroy around 75% of the Amazon. The

Amazon forest is straddled by the Amazon River which runs along several countries in South America. The river runs through Peru, Guyana, Bolivia, Ecuador, Venezuela, Colombia and Brazil. The length of the Amazon River is approximated at about 6400 kilometres (4000 miles). During the wet season, the width of the Amazon River can reach over 190 kilometres (120 miles). The combination of the river and the rainforest has contributed to the eco-balance in the region.

The Amazon is a giant carbon sink, hence environmental stress such as the 2019 forest fire, will eventually release all the trapped carbon into the atmosphere which could have a dire effect on the eco-balance. This is largely due to the fact that the Amazon contains 90 to 140 billion metric tons of carbon (WWF, 2019). Too much carbon in the atmosphere has been said to be one of the main drivers of climate change. Plants take in carbon dioxide and release oxygen. If the plants and trees are destroyed by fire or other environmental stress, the Amazon forest would not be able to take in much carbon anymore neither will it be able to produce nearly as much oxygen as it currently does. The Amazon has been said to release up to 0.5 billion metric tons of carbon per year before the 2019 wildfires. The reason for this, according to the WWF (2019), is attributed to land conversion by the locals and deforestation. Depending on the ultimate damage from these fires, the release of carbon would increase and this will

accelerate climate change even further. The contribution of the Amazon to regulating the world's climate can therefore not be over-emphasized giving its function as the huge hydrological engine of the world.

Water is released by plants into the atmosphere and also to the ocean through the Amazon's rivers. In 2018, National Oceanic and Atmospheric Administration (NOAA) posited that weather patterns are largely driven by ocean currents. The currents help in regulating the weather by conveying warm water and precipitation from the equator towards the northern and southern poles. The currents further transport cold water from the northern and southern poles to the tropical regions of the earth. Without these currents, regional temperatures around the world would be much more extreme than it currently is. Owing to its massive size, the forest releases a lot of water through the evaporation process. The absence of a balanced ecosystem through environmental stress will thus reduce the contribution of the forest to the stability of world climate due to far less evaporation. The WWF (2019) suggests that this situation will result in severe temperatures around the globe as well as changes in seasonality, droughts and desertification in the South American region thus raising human security concerns.

### **The Phenomenon of Wildfire**

Although this isn't the first time of its occurrence, the swelling scale of forest fires in

the Amazon in 2019 by about 85% compared to about the same period in 2018 has become a source of major concern to not just environmentalists and conservationists, but also world leaders. Furthermore, according to Brazil's National Institute for Space Research, 74,155 wildfires were recorded in 2019 and that is about 84 percent increase over 2018 alone. Although wildfires are common occurrence during dry season due to the propensity for escalation as a result of the climatic conditions and wind, the number of wildfires recorded this time around was unprecedented.

Similarly, more than 9,500 fires were recorded between the first and second week of August 2019 (Dawkins, 2019). More so, the smoke from the fire billows above 1.2 million square miles of land. Scholars, such as Ruzo (2019) argued that fires do happen and are commonplace in some instances; however, the recent scale is indeed worrisome. He opines that the plumes of smoke will leave haze in its wake, have effect on oxygen and may lead to health challenges. The attendant deforestation of about 30 standard football fields of the Amazon will affect, in no small measure, the flora and fauna of the forest and in general, impact the living conditions of inhabitants of contiguous areas and cities with regards to health and subsistence. The contiguous areas are not limited to Brazil alone as the smoke covered approximately half of Brazil while bordering countries, such as Bolivia and Peru, were not left out. A journalist with

ABC news stated that the smoke caused daytime blackouts several times in Sao Paulo, Brazil's largest city, which stands about 1,700 miles away. NASA satellite images recorded in the second week of August 2019 attest to the postulation given by the ABC reporter as it shows vividly the extent of the fires burning in the Amazon forest.

The Amazon is one of the most biodiverse areas on the planet with the propensity to have undiscovered species which have medicinal or perhaps new molecules that could contribute to improving the human condition. This is so because the ever-hanging ecosystem can be likened to natural biological warfare in which case the constant interaction of plants, animals and insects results in each element trying to outdo each other and this leads to the creation of new (undiscovered) compounds which can in the long run greatly benefit the environment and the peoples of the world.

It is still unclear if the fires were deliberately started for farming purposes or by pure accident despite various postulations. Nevertheless, the Amazon is a source of livelihood to the locals. Beef is a big industry in Brazil and the industry contributes in no small measure to bush cutting, paths clearing and deforestation. Tree felling is also a constant because other natural resources which are sources of livelihood in the locale include palm oil and wood processing which require high amount of energy. A large amount of biomass is removed from the

environment by pulling down the trees in the Amazon forest which is done mainly by the use of bulldozers and tractors during the rainy season (usually from November through June). During the dry season (usually from July through October), tree trunks are usually burnt (Margolis, 2004)

### Climate change driven fires?

Notable global incidents, such as the ice cap melting, have been laid at the feet of climate change. Climate change has received attention from environmental scholars, conservationist and some political leaders such as the former Vice-President of the United States of America, Al Gore. The need to protect the environment has topped the agenda of United Nations Environment Programme (UNEP) summits and conferences all with a view to conserving the environment for mankind due to the exacerbation of environmental deterioration recorded in the last decade, and the threat of environmental calamity. However, the Amazonian fires has been described as a potent symbol of humanity's indifference to environmental disorders most especially with the danger the fires pose to the world environment. While some scholars have linked climate change to the Amazon fires and suggested that the fires may have been as a result of climate change extremes, the question still resonates and borders around the propensity of the fires to have been started primarily by weather extremes.

Climate change may however not be the primary cause of the Amazon wildfires. Most California fires, for instance, were often sparked by accidents such as lightning strike or power line cut or some other similar incidents. Subsequently, the resulting fires were intensified by climate change. This raises the question of whether the Amazon wildfires can also be likened to the same scenario. Available evidences suggest that these fires did not start by lightning strike. It suggests that the fires were ignited and the ignitions are said to primarily be targeted at land already cleared for ranching and farming. However, they can and they do spread into old-growth forests. The noticeable surge in burning has been accompanied by a spike in deforestation in the region leading to an average of 1,330 square miles of the Amazon rainforest being lost since January 2019, translating to 39% increase over the same period in 2018 (Stewart, 2019). Spontaneous fires in the Amazon cannot be said to have originated from warm weather as a result of global warming alone. It is generally agreed that warm weather is capable of exacerbating the fires once started due to the fact that there will be drier biomass available for the already started fire to spread. Thus, once the intensity of the smoke elevates higher into the atmosphere than normal, compared with naturally occurring wildfires, it is naturally assumed that the fire intensity is escalated by the dry biomass. The Brazilian example showed further evidence of the fires being often likely

caused and triggered by human activities because of their clustering near roads and well-marked agricultural areas, rather than in the remote parts of the Amazon forest.

According to Rosen (2019), deforestation in Brazil is partially driven by the growing demand for beef and soy exports. Soy exports from Brazil to China rose by 18% due to prevailing trading tensions between the United States of America and the Republic of China. According to Dawkins (2019), the Amazon accounts for 14 million of the 284 million acres of soy plantations in Brazil. Similarly, ranchers wait until the dry season to slash-and-burn to give time for the cattle to graze (giving that Brazil makes up to 20% of global trade on beef). Slash and Burn agriculture is a method of growing food whereby cattle ranchers and farmers deliberately cut down and burn forestland in a bid to clear it for agricultural usage, logging and livestock rearing. Although slash-and-burn carried out by cattle ranchers in Brazil can be controlled, unskilled soy farmers may end up causing wildfires. Pavid (2019) noted that another possible driver for the fire, apart from the activities of farmers and ranchers, is the land-grabbers who have been illegally cutting deep into the forest in "Brazil's indigenous territories and other protected forests throughout the Amazon". These possible triggers can however not be possible without political accommodation of their activities. This is why environmentalists and world leaders

have categorically asserted that the bulk of the blame lies on the Brazilian President's table.

Brazil's political leadership changed on January 1, 2019 when Jair Bolsonaro, a far-right populist, was sworn in as President. During his campaign, he promised to weaken the Amazon's environmental protectionists and open up the rainforest to wide economic development. The three Brazilian States which have experienced the worst increases in the 2019 fire are all governed by Bolsonaro's allies while the states governed by Bolsonaro's political opponents who oppose his policies have experienced a decline in fires. His administration has reduced the budget of Brazil's environmental protection agency by 24 percent, laid-off the director of the National Institute for Space Research (INPE) and cancelled among others, various environmental offences fines. Furthermore, Brazil has lost more than 1,330 square miles of forest cover to development since Bolsonaro took oath of office. When asked about the fires however, Bolsonaro implied that environmental Non-Governmental Organisations (NGOs) were behind the burning.

Furthermore, the opinion of the President of France, Emmanuel Macron, that the fires were a crisis, was opposed by Bolsonaro who accused the French President of "misplaced colonial mindset" while stating that the Amazon is bigger than Europe hence, fighting criminal fires in such an area poses a serious challenge. The Amazon rainforest in

reality belong to Brazil; however, as a store house of carbon, it is fundamental to the survival of every person on earth and therefore, all should be concerned. If destroyed or degraded, the Amazon is simply beyond humanity's ability to revive. Replanting trees by every human being on earth will not restore the diversity of creatures currently living across the Amazon for roughly 10 million years.

Following international outrage with regards to the rising deforestation, the Brazilian leader bowed to pressure and ordered the country's armed forces to fight forest fires in the Amazon. He subsequently deployed soldiers into nature reserves, indigenous lands and border areas beset by fires. This is a reversal from the President's stand which had been earlier seen as emboldening miners and loggers. Threat by various countries to sanction Brazil's economy if the nation did not act to stop the fires had however been attributed for the change of heart by the President. According to D'Amore (2019), the Brazilian President opined that forest fires "exist in the whole world" and "cannot serve as a pretext for possible international sanctions", thus condemning the sanctions against his country. The deployment of soldiers was left to regional governors who can request preventive actions against "environmental crimes" and ask the army to survey and combat fire outbreaks.

**Why should Africa be Concerned?**

The Amazon forest accounts for about a quarter of CO<sup>2</sup> removal service by all the world's forests yearly, which translates to the forest holding an equivalent of 10 years' worth of global greenhouse gas emissions (Schwartz, 2015). The ability of the Amazon to pull in more carbon than it releases is being diminished by the changing weather patterns, tree mortality and deforestation, thus the fires will further weaken its function as a carbon sink. Continued destruction and degradation of the Amazon can push the forest to a tipping-point which may trigger a self-destruct circle of forest 'die-backs', thereby converting the lush and rich rainforest to a savannah. Corporate pollution and emission from industries cannot be effectively absorbed by the atmosphere through the Amazon if the fire continues, hence degrading the carrying capacity of the environment in places as far away as Nigeria.

More dire is the possibility of releasing 200 billion tonnes of CO<sup>2</sup>. This will in no small measure exacerbate climate change extremes and have grave consequences on human population. While some scholars have projected oxygen shortage as a resultant effect, Watts (2019) and Stewart (2019) dismissed such claims and stated that there is no reason to worry about oxygen shortages. This is in part due to the fact that there are other oxygen generating sources around the world.

African scientists have, nevertheless, opined that the effects of the Amazon fires may not be

easily felt in Africa. This is due to the presence of the second green lung of the earth in Africa. The Congo basin forest is commonly referred to as the second green lung of the planet, after the Amazon. The forests cover an area of about 3.3 million square kilometres in Democratic Republic of Congo, Central Africa, Cameroon, Gabon and Congo Brazzaville. The effects of the Amazon fire can be counteracted by the Congo rainforest thereby providing a cover for the African continent. Pavid (2019) opined that this may be a temporary cover if the Amazon fires continue, hence advice that the focus of all and sundry should be on finding methods to put an end to the Amazon fire. The Environment Minister of Congo, Mr Robert Bopolo Bogeza, has opined that the comparison of the Amazon and Congo fire is misplaced. The Congo fires according to him, are due to traditional seasonal farming methods and are only done in areas not directly connected to the Congo rainforest, hence no cause for alarm.

### Threat to Human Security

Loss of biodiversity will have its effects on the environment and some wild animals which may escape the fire could seek refuge in other countries of the world, thereby causing havoc along the way. Moreover, by upsetting the ecosystem, the fire is likely to cause a distortion to the food chain, threatening food security of all humans and even animals on earth. The loss of insects, birds and slow-moving animals may also reduce the richness of the planet and disrupt the



smooth function of the world ecosystem. The Amazon River will also be affected and fishes such as the freshwater Dolphins, Slots, Tapirs and Armadillos may likely die in droves. The heat from the fire may lead to death of several fishes and mass exodus of others, hence putting pressure on food security and the water ecosystem of the world. Fauna which cannot adapt to the temperature would indeed relocate from familiar habitat to an unfamiliar habitat. This would in turn disrupt the ecosystem where they relocate to and may lead to adaptation crisis of various species, posing a challenge to man.

Wild animals on exodus may change feeding patterns and forage into human habitation causing untold damages. The probability of extinction of known and endangered species is also high, thereby putting a huge dent on conservation and rubbishing efforts which have been put over the years on conservation. Furthermore, conservationists opine that species yet to be discovered exist in the deep of the amazon and the fires if not combatted on time, may lead to the extinction of the species and man would not have the opportunity of discovering such species (WWF, 2019). Similarly, the destruction of the Amazon would also harm its role as a provider of freshwater for virtually every country in South America—except for Chile, which is blocked by the Andes Mountains.

The fires have the propensity to exacerbate climate change effects not only in Amazon but round the world due to the possible increase in carbon monoxide and carbon dioxide emissions and massive loss of biodiversity. Excessive bush burning leads to ozone layer depletion which will consequently results to increase in mean temperature. Apart from heat waves, which increase in mean temperature will spread, icecap melt is a likely phenomenon. It must be noted that icecap melt is a major contributor to increase in sea level which is at the heart of the 2015 United Nations Climate Change Conference (COP 21). Coastal States in Nigeria such as Lagos and Rivers, have been battling with the effects of sea level rise. Dealing with further sea level rise will pose a gargantuan challenge to the goal of environmental sustainability in such states. Thus, the Amazon fires are a threat to future existence of humans on earth, and that stands it out as a human insecurity indicator.

### Conclusion and recommendations

The Amazon rainforest is key to the world's biodiversity preservation and it is integral to mankind's continual survival on earth. Climate change has been identified as one of the drivers of wildfires in the Amazon. However, the recent fires have been helped along by political exigencies and man's activities. The wildfires are however leading to climate change extremes and spreading of haze and darkness over the South American atmosphere. Furthermore, species

flight and possible extinction is occurring on a daily basis thereby driving ecological instability in the South American region and the World at large. The world environment is gasping and grappling with climate change effects and efforts are being made daily to conserve the environment. The recent wave of wildfire will further exacerbate climate change and bring the threat of environmental extinction closer. Thus, putting the Amazon fires under check cannot be over emphasized.

Citizens and leaders across South America and around the world need to create and promote a new vision of the Amazon, one that recognizes that the natural and economic assets of the region must be managed to maintain its essential role for South America and in sustaining the health of the planet. This should be backed by reforestation drive as well as a shift from the predominant monoculture agricultural practices.

Educating inhabitants and indigenous dwellers of the Amazon on the importance of the rainforest to their survival and the world is key. This should be backed by the political will for conservation of the Amazon region by all stakeholders. Every tree is important, hence every human being should be encouraged to plant trees everywhere as a long-time plan to reduce the dependence of the world on the Amazon as its major carbon sink.

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