

DEFORESTATION: ANALYZING GLOBAL IMPLICATIONS

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Abstract

Humans alone are not custodians of Earth, but their activities are responsible for destroying its balance and making the living conditions of other creatures and themselves difficult. These human activities include spreading trends of urbanization, driven by population growth, increasing demands for wood as fuel and timber, agricultural expansion, industrial growth, and various other factors, which act as major agents of deforestation across the globe. From one perspective, all these factors hold both economic and social significance, but from an environmental viewpoint, they are pushing the planet toward destruction. The shrinking forest cover has a devastating impact on the climate. Earth's temperature is rising, the ozone layer is depleting, and these changes have serious consequences for biodiversity.

Key Words: Deforestation, Global, Destruction, Climate, Biodiversity

Research Questions:

This study aims to highlight,

- What are the main causes of deforestation?
- What are human activities that are responsible for climate degradation?
- What are the implications of deforestation for humanity?
- What are the measures to prevent deforestation?

METHODOLOGY:

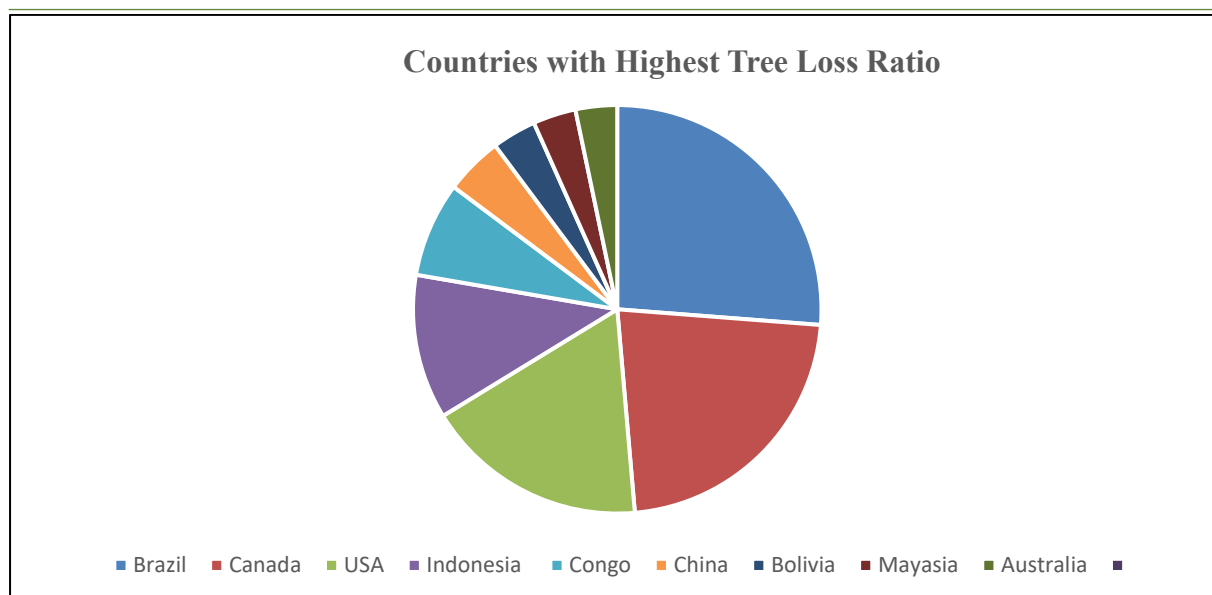
This study adopted a mixed approach of qualitative and quantitative methods. Qualitative data collected from various primary and secondary sources was supported by quantitative method by using charts and tables for the clarity of the study. A case study approach and content analysis method are used to analyze the data. Experts' interviews and talks are incorporated to support the argument.

INTRODUCTION:

One-third of the world is covered with forest. But unfortunately, this area is under severe threat due to the ruthless cutting of forests for various human activities. The use of forest land for non-forestry purposes like timber, firewood, development, roads, housing, etc. the natural ecosystem of that area lost as well as its natural beauty. The communities dependent on the forest for food and economic purposes faced challenges due to this deforestation.

According to UN estimates, the forest loss per annum is 10 million hectares, and 70 million hectares are affected by forest fires. Global Forest Watch indicates that 16% total trees were lost globally between 2002 to 2024, which is a high number (Global Forest Watch, 2025). Russia as a state has the highest deforestation ratio, while as a continent, Africa ranks first in deforestation. In South Asia, the deforestation rate is high in India.

Fig: 1. Top Ten Countries with Highest Tree Loss Ratio (2001-2024)



Source: World Resources Institute, Global Forest Review

Due to this loss of forest, the UN General Assembly, in its November 2012 session, decided to celebrate 21 March of every year as International Forest Day worldwide. Originally, the idea of International Forest Day was proposed by the Food and Agriculture Organization (FAO) in 1971 to raise awareness about forests, and it was officially adopted by the UN in 2012. The purpose of celebrating this day is to raise awareness about the vital importance of forests for humanity's survival on Earth. The first World Forest Day was celebrated on 21st March 2013. In 2025, the theme of International Day of Forest was "Forest and Food". This day serves as a reminder to save the planet for future generations by preserving our forests. Without this green creature, life would not be possible on Earth.

The forest-covered area of Pakistan is only 5% which puts it in the category of a forest-deprived country, because for the sake of a stable economy, at least 25% area of a state should be covered with forest. Unfortunately, each year Pakistan is losing almost 11,000 hectares of forest or the deforestation ratio is 1.5% which is very high (Gokmen, 2025). Multiple factors are responsible for deforestation.

Causes of Deforestation:

Multiple factors are responsible for deforestation. Given below is the detail of each factor,

• DEVELOPMENT

In the past couple of centuries, the world has seen many drastic developments in almost every field of life. These developments have undoubtedly led to many environmental problems, and deforestation is one of them. Forests are cleared to accommodate expanding urban areas. In the 1960's only one-third of the world's population lived in urban areas. By 1999, that percentage increased to 47%. It is estimated that by 2030, more than 60% of the world population will live in urban areas (Mughal, 2005).

In Pakistan, the urbanization rate is highest among the SAARC countries (Naiz, 2010). Lahore has particularly been a victim of this mindless development (Dawn, 2004). In Lahore only, over 18,000 trees were uprooted during the construction of underpasses and the expansion of the road network. The majority of the trees, which became victims of the development, were 100 years old (Ali, 2005). WWF-Pakistan published a report in 2024 in which it was clearly identified that along the Karachi coast, many mangrove forests were cleared due to the establishment of commercial, industrial, and housing schemes along the coast (Dawn, 2025).

• OVERPOPULATION

Another cause of rapid deforestation is that population pressure of the local communities themselves is leading to the disappearance of the forests (Akhtar 2008). The current human population of the world has increased to 6.81 billion. Due to the increase in population, the earth's resources are depleting fast as they decline significantly because they are being divided among more and more people (Niaz, 2010).

The population of Pakistan has risen from 32.5 million in 1947 to about 255 million now and it is expected to double in 2050 (Malik, 2006). This population rise entails a dangerous increase in deforestation.

• AGRICULTURE

With the advent of agriculture, forests became the prime tool to clear land for crops (Alam 2010). The research reveals the fact that agricultural expansion is one of the leading factors of deforestation, where farmers and firms directly convert forest cover area into agricultural land (UNEP, 2003). The pressure for agricultural land accounts for 60 to 80% of the world's deforestation (Niaz, 2010). In Africa, agriculture is the prime factor of deforestation. Between 1966 and 1980, in Côte d'Ivoire (any African state), five million hectares of forest area were cleared to convert it into agricultural land, and almost 3 million cubic meters of wood were destroyed (World Rainforest Movement, 2001).

According to Greenpeace International, 50 million hectares of forest, an area equal in size to Spain, were destroyed at the start of 2020 to meet the demand for daily commodities. The IPCC Climate Change and Land report suggests that deforestation due to agricultural commodities like palm oil, soy, and cattle is eroding biodiversity and creating a climate emergency. Palm oil demand has been increasing day by day since 1990 due to its use in soap, shampoos, cookies, etc. Indonesia is the world's largest producer of palm oil. Resultantly, Indonesia destroyed its rainforest to meet the growing demand for palm oil. Soy farming is also the biggest cause of deforestation, especially in the Amazon region. 90% soy is used as a feed for animals (Greenpeace, 2025).

This situation also prevails in Pakistan. For instance, there are 23 villages around the Pie-forest, in Sindh, having a population of around 30,000, that add extra pressure on the forests by grabbing land for the cultivation of cash crops (Gilani, 2009).

- **LACK OF IRRIGATION/ RAIN**

The irregular rain pattern and lack of a proper irrigation system also affect the forest cover areas (Budiman, 2021). Lack of irrigation water is another major cause of forest degradation. Although in the previous forest policy of Pakistan, it was laid down that 10% water would be reserved for forest development, no effective measures were taken, and due to drought, many important plantations died (Kamario, 2005). The riverine forest of Sindh is also in danger due to a lack of water in the Indus River.

- **CATTLE GRAZING**

Another of the more devastating forces behind deforestation is cattle grazing. With the international growth of fast-food chains, this seems to be an evident factor in the clearing of trees. Large co-operations looking to buy beef for hamburger and even pet food seek cheap prices. The supply of cattle to these cooperatives needs, in turn, the growth of cattle grazing. In the Amazon region of South America alone, there are 100,000 beef ranchers. As the burger giants of industrialized society are making high demands for more beef, more forests are being torn down. Statistics of 1989 indicate that 15,000 km² of forests are used expressly for the purpose of cattle grazing. Once the trees are gone, the land is often overgrazed. In some places government wants this to happen. In Central America, in the past 40 years, 40% area of forest has been reduced due to pasture areas and cattle ranching (Policy Brief, 03).

Similarly, the direct cause of the degradation of Pakistan's rangelands and forests is also the rapidly increasing domestic livestock population. Between 1945 to 1986, the number of cattle almost doubled, while the number of buffaloes, sheep, and goats went more than triple. The overall livestock numbers continue to increase at a rate of 2% per year. Forests are cut down to create land for grazing cattle. Longish green belts on either side of the Grand Trunk (GT) road have been occupied and encroached by cattle, and the greenery is vanishing rapidly (Khan, 2009).

- **TIMBER**

Forests are rich sources of timber and other products. In timber products, lumber and plywood are the most widely used materials in the construction industry and furniture. Timber provides raw material for paper, sports goods, and the match industry (Ranjha, 2007). The increase in the demography is directly proportional to the demand of use of timber. According to FAO, the annual increase of sawn-wood is 1.5%, panel-based wood is 3.3% and for paper, it is 3% in the last fifteen years (2005-2020) (FAO, 2009). The industrialized countries and the USA are responsible for the consumption and deforestation of tropical forests. These states are extensively using timber from these forests for their industrial use. The world's third transnational crime is the illegal trade of timber (WWF, 2025).

In Pakistan, about 200,000 cubic meters of timber are produced annually. The main sources of timber are coniferous, irrigated, and riverine forests (Fazle, 2006). There is also a huge gap between the production and consumption of timber. From 1993 to 2018, the consumption of wood increased from 29.5 to 52.6 million metric tons, but on the other hand, the production rate was negligible.

- **FUEL WOOD**

More than two-thirds of people in developing countries depend mainly on wood for their household energy needs. In rural areas, the forest as a source of fuel wood is fundamental for the continuity of everyday life. According to an estimate, more than 80% of the wood harvested in developing countries is burnt to cook meals, heat homes, and sustain rural industries (The News, 2003). According to the United Nations and Asian Development Bank (ADB) more than two billion people rely on wood-based fuel for their domestic energy needs, particularly rural and the under-privileged community (Wattoo, 2008). In Pakistan, the wood is also used as fuel on a large scale, especially in Northern and hilly areas where no alternate source of fuel is available, particularly in winter when some source of heat is extensively needed in the mountainous region of Pakistan (Thaheem, 2025). So, the non-availability of an alternate source of fuel and the quite expensive fuel of fuel are two major pushing factors that compel the poor and marginalized communities living in hilly areas and near forests to use forest wood for fuel purposes. A person dying of a cold will not bother the deforestation until it does not get some other source of heat. Some researchers and analysts believe that the use of fuel wood is less responsible for the destruction of forests because the poor communities living in the surrounding of the forest were using the pruned branches of trees as fuel wood, and they are not uprooting the trees (World Rainforest Movement, 2001)

- **FOREST FIRE**

Globally, wildfires are another factor that contributes to the destruction of forests. According to Global Forest Watch, the tree cover lost from forest fire is 152 million hectares between 2001 to 2024. It means forest fire is

alone responsible for 29% forest cover loss globally (Global Forest Watch, 2025). Russia has the worst record in this regard. It had the highest forest fire rate in the world, with an average of 2.60 million hectares of forest lost every year. In 2021, due to the heat wave, almost 18 million hectares of forest were burnt due to wildfire in Russia, and it broke the previous record of the 2012 forest fire that burnt 17 million hectares of forest areas (The Moscow Times, 2021). The Following States have the highest number of forest fires in the world

Table. 1: Top Countries with Forest Fires

Sr No.	Country	Forest Lost
1.	Russia	2.60 Mha
2.	Canada	1.68 Mha
3.	United States	551 Kha
4.	Brazil	538 Kha
5.	Australia	275 Kha

Source: Global Forest Watch

Besides drought and heatwave, some miscreants set the entire jungle on fire, causing damage to both the environment and natural habitats every year (Sadaqat, 2003). For the purpose of creating terror or to conceal the crime of cutting trees, the most successful tactic of the mafia is to set a forest on fire through their agents. The network of the mafia is always alert, and the most favorable season for them is dry summer, particularly between March and May (Mirza, 2005).

India and Pakistan are top among the South Asian states for the incidence of forest fire in the last decades (Vadrevu et al, 2022). Five forest fire incidents took place in Khebrani and Rais Mureed forests of Matiari district of Sindh over the past two years, in which trees on 163 acres were completely burnt down. In Punjab, the surge in forest fires is recorded as 89% (The Express Tribune, 2025)

• OFFICIAL INVOLVEMENT IN DEFORESTATION

The WWF report reveals that even those in government are involved in destroying the country's ecology by allocating precious forest lands to commercial organizations and influential individuals, often to secure monetary benefits or political support (Ahmad, 2010). Several forest officials are also involved in illegal cutting and smuggling of timber. In Pakistan, Swat officials are highly involved in timber smuggling (Khan, 2007).

Some other causes of deforestation include governmental mismanagement, corruption, economic development, a lack of political will and commitment, poor planning, unrealistic forest management plans, and weak implementation of forest protection laws (Hassan, 2006).

CONSEQUENCES OF DEFORESTATION

Above mentioned causes of deforestation have grave consequences for all living organisms on Earth. A few consequences are listed below:

• INCREASE OF CARBON DIOXIDE IN THE ATMOSPHERE

Scientists estimated that emission of 17% of global carbon dioxide is result from deforestation (Khan, 2010). Deforestation, which is occurring all over the world, has a double-damaging effect: it reduces the number of trees that can absorb the carbon dioxide produced by human activities, and it releases into the atmosphere the carbon contained in the trees that are cut down (Sunil, 2008). Carbon dioxide is a major contributor to the greenhouse effect. Due to deforestation, there would be more greenhouse gases that would not only pollute the environment but also affect the ozone layer, letting the harmful radiations of the sun to get through (The Nation, 2006).

Carbonic acid is formed when carbon dioxide is dissolved in seawater, which leads to ocean acidification. other than climate change, it threatens marine life and food supplies globally. If atmospheric carbon dioxide level continues to rise as expected by 2050, some species will face extinction (Mughal, 2010).

Developed countries have a greater contribution to CO₂ emissions than developing countries, but the consequences are more severe for vulnerable states. The developed states have high living standards, and they are burning more fuel.

Table. 2: Countries with the Highest CO₂ Emissions (2023)

Sr. No	Country	CO ₂ Emissions 2023 Million Tones
1.	China	13,260
2.	United States	4,682
3.	India	2,955
4.	Russia	2,070
5.	Japan	945
6.	Iran	779
7.	Indonesia	675
8.	Saudi Arabia	623
9.	Germany	583
10.	Canada	575

Source: World Population Review 2023

The analysis revealed that the major source of CO₂ emissions in these states is the extensive use of fossil fuels. China and America, the leading nations of CO₂ emissions, use coal as a source of energy either to run their industries or for heating and cooling purposes. Although these states make many promises and assurances to cut their carbon emissions but till they are leading since three-four years. Another factor that is also responsible for carbon emissions was the extensive use of weapons in conflicts and wars among various nations, like the War on Terror, the Ukraine-Russia War, the India-Pakistan cross-firings and conflicts, the Palestine-Israel War, the Iran-Pakistan Conflict, Iran-Israel, etc. (McKay, 2024).

- **GLOBAL-WARMING**

An expert, Sir Nicholas Stern, who made a review of the climatic changes for the United Kingdom, identified deforestation as one of the major causes of global warming, fearing that the global temperature will rise by 2 to 3 centigrade within the next 50 years (Irtaza, 2009). The greenhouse gases like carbon dioxide accumulated in the atmosphere are responsible for global warming; these gases are transparent to incoming short radiation but opaque to long-wave radiation. So, heat is trapped in the atmosphere, and this heat warms the atmosphere (fao.org). Global warming has caused the shifting of vegetation zones to higher elevations with significant threats to biodiversity and ecosystems (Niaz, 2009). Heat wave in Russia, floods in Pakistan, mud sliding in China, drought in Niger, and reportedly melting of ice of the Arctic Ocean show conclusively that the world is warming, and 16 countries have experienced record temperatures in 2010 (Vital, 2010).

- **DISRUPTION IN RAIN-CYCLE**

Trees extract groundwater through their roots and release it into the atmosphere and bringing rain. But when part of a forest is removed, the trees no longer evaporate the water, resulting in a much drier climate (Hussain, 2010). Cherrapungi in Meghalaya, India was known as the place where there was the highest rainfall in the world, but for the last decade, due to the falling of trees on a large scale in that area, the rainfall has been reduced and Cherrapungi has lost its pride place in geography (Doabia, 2005).

Forest is also a source to absorb the rainwater; in the absence of forests the rainwater

- **FLOOD**

Flooding is a quite serious consequence of deforestation. One of the vital functions of forests is to absorb and store a great amount of water quickly when there are heavy rains. When forests are cut down, this regulation of the flow of water is disrupted, which leads to alternating periods of flood and then drought in the affected areas. When floodwater does not encounter any resistance in mountain areas, it comes down with ever-increasing velocity and destroys everything that comes in its way. Bruce Dunn, an environment specialist with the Asian Development Bank's Regional and Sustainable Development Department, said the destruction of forests across Asia was one of the major causes of flood disasters (Malakunas, 2010). The massive deforestation at an annual rate of 0.4% was the main reason for the devastating floods faced by Pakistan (Majeed, 2004).

The frequency and intensity of flood increased dramatically in one decade due to climate change. Top ten countries that adversely affected by the flood and drought are Somalia, China, Philippines, Pakistan, Kenya, Ethiopia, India, Brazil, Bangladesh and Malaysia. The frequency of flood and drought rose from 26 in 2013 to 656 in 2023 in these states that is almost 120% increase. The number of displaced person in these states soared from 3.5 to 7.9 million in just ten years (2013-2023) (Oxfam, 2024). Only in Somalia in 2023, 460,000 people were affected by flash flood (Martha, 2023).

Pakistan has faced more than 30 devastating floods since its inception, and after 2010, the devastating floods have become a regular phenomenon that takes millions of lives and property every year (Khan, 2010). The super flood of 2010 alone had taken the lives of 1985 people, and economic loss of \$ 9.7 billion, along with 0.2 billion affected. The second devastating flood was in 2022. According to UN, it cost the lives of 1033 and affected 33 million, and destroyed the crops covering an area of 2 million acres (Yadav and Bhan, 2010).

Most of these states are not prepared to cope up with this climate change due to their fragile and poor economic conditions and unstable governance system (Oxfam, 2024).

- **SOIL EROSION AND LANDSLIDING**

Soil erosion implies the loss or removal of surface soil material through the action of moving water, wind, or ice (Bhutto, 2010). If trees and other vegetation are present on the surface of soil, they protect it from the direct action of wind and water, but in barren, unprotected land the raindrops hit the soil directly and carry with it the soil particles, which have taken hundreds of years to form. Fast-running water also causes landslides and other calamities (Doabia, 2005). Soil erosion have adverse affect on fertility of soil. The top most layer of soil is fertile and more productive for agricultural products but its removal make the land barren. A study of United Nations shows that soil erosion causes \$ 10 billion loss to South Asia nations that is equivalent to almost 2% of the region's GDP. Soil erosion is taking place at an alarming rate in the north of Pakistan due to deforestation (Bhutto, 2010). In future it will also be responsible for food insecurity and unemployment.

- **EFFECT ON DAMS**

The extensive and continuous cutting of forests in the water shade area has also been instrumental in increasing sedimentation levels in water reservoirs, and it has reduced their water storage capacity (Samdani, 2005). With deforestation and denudation of hills, the storage capacity of the Terbela and Mangla dams has largely been affected due to sedimentation. It is estimated that approximately 28% and 20% gross storage capacity of these reservoirs has been lost, respectively. This will not only affect downstream communities and their microclimate but will also produce a power shortage (Niaz, 2006).

• LOSS OF BIODIVERSITY

The term “biodiversity” is commonly used to describe the number and variety of living organisms on the planet (Sunil, 2008). Due to deforestation worldwide, biodiversity is also endangered, e.g, 976 tree species are facing extinction. The number of species facing extinction in Malaysia is 197. In Indonesia, 121, in India, 48, in Brazil, 38, and in Pakistan, two tree species are facing extinction (Ali, 2007). Record shows the extinction of the rhinoceros, lion and cheetah from Pakistan. It has been observed that that Siberian crane migrating from Siberia was last sighted in Pakistan a decade or so ago (Niaz, 2009).

• DESERTIFICATION

Approximately one-third land area on the planet is affected by desertification. Desertification refers to the loss of what was previously agricultural land, grazing area and criminal depletion of forest and other tree cover. The largest desert of the World, The Sahara Desert is expanding southward with an alarming rate of 48km per annum. This make the land inhabitable for populace living in surrounding and became a pushing factor for them to evacuate the area. China that already poses fifth largest desert of the world, its desert share is creeping rapidly since 1980s. Now 30% area of China is covered by desert that not only threaten the land degradation but also producing food insecurity for the largest population of the world. According to the Coordination of Humanitarian Affairs (OCHA) of the UN Office, Yemen is losing 20% of its arable land each year due to desertification. Tunisia is also worse affectee of desertification and lost almost 95% arable land (Owen, 2021).

The problem of desertification in Pakistan has reached an unprecedented level as almost 90% of the country’s land area is classified as either arid or semi-arid, and the situation is particularly bad in Sindh and Balochistan (Khan, 2009). Desertification has environmental impacts e.g., a loss of vegetation can increase the formation of large dust clouds that can cause health problems. It also contributes to global climate change by releasing carbon stored in vegetation and soils to the atmosphere (Khalid, 2010).

• EFFECT OF DEFORESTATION ON LOCAL PEOPLE

The ongoing trend of deforestation has a negative impact not only on the function of production and protection of the forests but also on the livelihoods of those who live in and around forests. Poverty is seen as a cause of forest loss, and forest loss contributes to maintaining or even increasing poverty (Shahbaz, 2004). The people who are immediately and severely hurt by the loss of forests are the local communities (Akhtar, 2008). Fuel wood, generated from both living and dead branches of trees, is a necessary part of people’s daily lives, as few can afford the expensive luxury of a gas cylinder for heating and cooking (Nasir, 2010). A survey by the World Bank (2000) supports the view that 25% of the world’s poor population depends directly or indirectly on forests for their livelihood (Wattoo, 2008).

• EFFECT ON ECONOMY

Forestry, after agriculture, is the most important sector for a country’s economic development. Advanced countries pay due attention to the discipline, but in Pakistan, it is one of the most neglected sectors. 25% forest cover is considered essential for any country’s economy, but Pakistan has failed miserably in this context (Kamario, 2005). The share of forestry in the GDP of Pakistan is 0.15% which is not satisfactory (Hassan, 2009).

CONCLUSION:

Multiple human activities are responsible for destroying the balance of the Earth. Forests are the lungs of nature, and if they get damaged, it is hard to survive for long. The research enlisted several human activities that are responsible for deforestation, but the analysis shows that forest land for agricultural use is the worst factor among them. As the population of the world exceeds 8 billion and is still growing at a rapid rate, the demand for food also increases. For food production, more agricultural land is needed, which comes after the cutting of forest area. Forest fire is the second most devastating factor of deforestation. Due to drought and human activities, a large area of forest turned into ash in a few hours that took centuries to grow. The consequences of all factors responsible for deforestation are extremely devastating. global warming, climate change, desertification, floods, and droughts make poor communities more vulnerable and increasing the overall food insecurity and poverty. According to the report published by five agencies of the United Nations on ‘State of Food Security and Nutrition in the World (SOFI), globally every eleventh person is suffering from hunger, and this situation is worse in Africa, where every fifth person is facing nutritional deficiency, and this will grow in the future if proper measures are not taken. These nutritional deficiencies also cause many diseases. The analysis of the emission of CO₂ shows that the top-most states are the developed states of the world, but on the other hand, the states that suffer from hunger, drought, flood, and diseases are mostly developing states (Rio, 2024).

A number of days, agreements, and summits are conducted and concluded to save the Earth from devastation. The Paris Agreement, which is a binding treaty on Climate Change, and all the members of the UN are signatories to it. This agreement has a promising approach to reducing the emission of Carbon. The USA, the second largest emitter of CO₂, decided to withdraw from this agreement in but later rejoined but giving a message that America and its energy sources are first (Stavins, 2017). The point is, if summits and agreements are only on paper and responsible states are not willing to take measures to reduce them, then miserable nations will pay the cost of development of developed nations.

There are a few suggestions to prevent deforestation and save the Earth for future generations.

- Instead of horizontal, the focus should be switched to vertical expansion of urbanization to minimize the merger of forest cover areas in cities.
- Treaties, agreements, and accords to control deforestation should be implemented in the true sense and spirit.
- The governments should encourage people to grow forests and take care of existing forests.
- Tree-covered areas should not be given on lease for various purposes.
- Corruption should be handled with iron hands in cases of responsibility for forest fires and illegal trade of wood, and involvement of forest officials in the sale of forest wood.
- Smart agricultural practices should be adopted in a way that the minimum area is used to get maximum yields.
- Afforestation activities, especially on the sides of roads, houses, offices, and surrounding areas, should be encouraged.
- Construction or development projects should be avoided in the forest areas.
- Use of fossil fuels should be discouraged, and renewable sources of energy should be encouraged.

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