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Editorial

Our planets forests are one of the most valuable resources we have, they provide us clean air, source of food, habitat for flora and fauna, construction materials and much more. One of the significant contributions of the forests is defense against climate change.

Forests are essential for the survival of human beings since they take in carbon dioxide and let out clean oxygen in return. Forests also play a vital role in the water cycle. Trees regulate the level of humidity in the air and affect rainfall patterns. In India, most farmers rely on rains to irrigate their fields. When forests are destroyed, they also result in the imbalance of water level below the soil.

A single tree can absorb as much as 48 pounds of CO2 from the atmosphere each year. Despite this the forest are systematically eliminated all across the world by a process known as deforestation. Deforestation refers to cutting down trees and clearing off forested land to make way for human settlement, agriculture or industrialization, urbanization, mining operations and use of wood for domestic and other purposes.

Deforestation has detrimental impacts on flora and fauna as well as human beings. Forests are an essential part of mother nature and regulate the oxygen level in the air. Trees provide shelter to a wide range of animals-some of which may be rendered extinct or endangered due to habitat loss due to deforestation. Additionally, forests also serve as habitats for many exotic and endangered species.

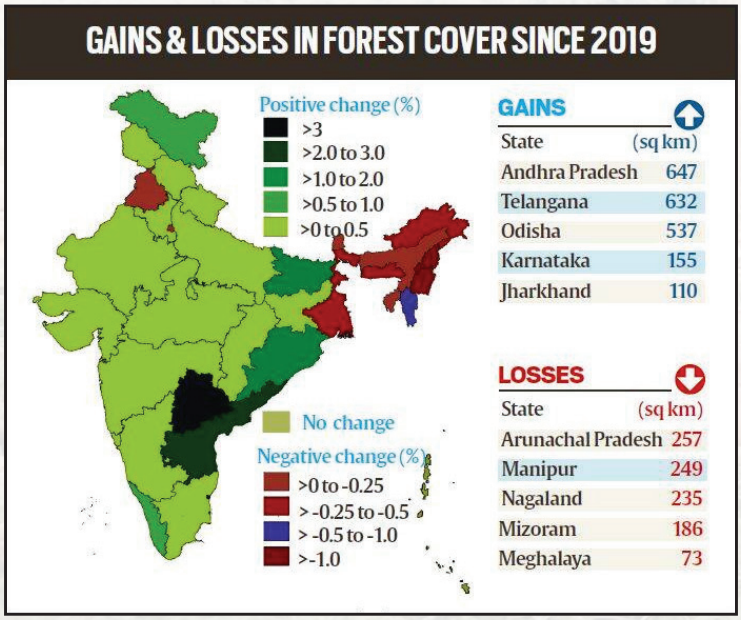
Each year 15 billion trees are lost in deforestation and forest degradation that is 36 football fields of trees are cut down in a minute, at this rate the worlds rain forest will be completely gone within a hundred years. Deforestation is responsible for around 13% of carbon emissions making a major driver of climate change. Not only do a tree absorb our carbon when they removed much of the carbon they have stored is released. Rapidly growing agriculture is responsible for the vast majority of deforestation.

Nagaland being an agrarian state with more than 70% of the population depending on agriculture. The traditional form of shifting cultivation i.e., jhum, is the method of cultivation that is widely practiced across Nagaland. Jhum occupies about 90% of the area under agriculture.

This issue aims to highlight about deforestation, status of forest cover in India, causes and the negative effects of deforestation due to anthropogenic activities.

Human pressure on forests is a persistent trend across the globe yet has changed in pace and magnitude over time. Forest cover loss has led to loss of biodiversity and ecosystem services and contributed to climate change. While forests covered about 50% of the Earth's land area 8,000 years ago, today only 30% of land is forested. Forest cover loss has human and natural causes, but the major driver is human activities that lead to a permanent conversion of forests to other land uses, or deforestation. Deforestation is often linked to expanding commercial agriculture to meet increasing consumption, along with subsistence agriculture to support the livelihoods of a large number of rural people. Deforestation tends to be preceded by forest fragmentation that leads to forest degradation and loss of wildlife, a long-lasting trend in many forests. Forest degradation can also result from unsustainable logging and fires. Forest degradation and deforestation both tend to reflect wider political, social and economic transitions facing societies such as urbanization, globalization, agricultural intensification and, lately, growing environmental effects linked to climate change.

STATUS OF FOREST COVER IN INDIA



(Source: ISFR, 2021)

- The total forest and tree cover of the country is 80.9 million hectare which is 24.62 percent of the geographical area of the country. As compared to the assessment of 2019, there is an increase of 2,261 Sq. km in the total forest and tree cover of the country. Out of this, the increase in the forest cover has been observed as 1,540 Sq. km and that in tree cover is 721 Sq. km.
- Increase in forest cover has been observed in open forest followed by very dense forest. Top three states showing increase in forest cover are Andhra Pradesh (647 Sq. km) followed by Telangana (632 Sq. km) and Odisha (537 Sq. km).
- Decline in forest cover has been observed in five states in the Northeast- Arunachal Pradesh, Manipur, Nagaland, Mizoram and Meghalaya have all shown loss in forest cover.
- Arunachal Pradesh lost the maximum forest cover of 257 Sq. km, Manipur lost 249 Sq. km, Nagaland 235 Sq. km, Mizoram 186 Sq. km, Meghalaya 73 Sq. km, Assam 15 Sq. km, Tripura 4 Sq. km and Sikkim lost one square kilometre forest cover.
- Area-wise Madhya Pradesh has the largest forest cover in the country followed by Arunachal Pradesh, Chhattisgarh, Odisha and Maharashtra.

Forest cover in Nagaland Declines: ISFR 2021

Nagaland lost a total of 235 Sq. km forest cover in two years, as per the India State of Forest Report (ISFR) 2021. Nagaland with geographical area 16,579 Sq. km has 234 Sq. km reserve forest and 8,623 Sq. km of unclassed forest, which includes all forest other than reserve forest and protected forest. State has 8,623 Sq. km of recorded forest areas, which is 52.01% of geographical area.

According to the report, total forest cover in north-eastern states reduced by 1,020 square kilometers in the last two years. It revealed that the north-eastern states have a total forest cover of 1,69,521 square km, out of their total geographical area of 2,62,179 Sq. km, which is 7.98 per cent of the country's geographical area. The forest cover in the eight north eastern states accounts for 23.75 per cent of the total forest cover of the country.

The decline in the North-eastern states has been attributed to a spate of natural calamities, particularly landslides and heavy rains, in the region as well as to anthropogenic activities such as shifting agriculture, pressure of developmental activities and felling of trees.

CAUSES OF DEFORESTATION

Shifting Cultivation

Shifting cultivation commonly known as slash and burn agriculture is an age-old traditional agricultural practiced in Nagaland. The system involves cultivation of crops on steep slopes by cutting of forests, bushes, etc., up to the stump level, leaving the cut materials for drying and final burning to make the land ready for cultivation of different crops for 2-3 years till yield becomes unproductive. Once the land becomes inadequate for crop production, it is left to be reclaimed by natural vegetation for years to regain and a new piece of land is then selected to repeat the process. The periodicity after which cultivation is again taken up in the Jhum land is called Jhum cycle.

Images of clearing of forests for jhuming

Images of burning of fields for Jhum cultivation

Urbanization

Often urbanization and developmental activities lead to deforestation. Today, trees are cut down in massive scale for building and upgrading roads. The process of deforestation begins with building of infrastructure in the form of roads, railway lines, dams, townships, electric supply etc. Urban Development process for economic growth has led to loss of forest in the State. The effect of development in urbans is seen in all the major towns but is most prominent in the capital town of Kohima and the commercial hub of the state viz. Dimapur.

Clearing of forests for upgradation of National Highway 29

Logging

Firewood has been used as a source of energy for cooking and heating purposes. In India 27% of the fuel-wood is derived from the forest whereas in the northeast it is more than 70% which lead to massive deforestation. Firewood is commonly used as domestic fuel by the people of Nagaland. Logging for developmental activities and for economic benefit has also led to high deforestation. Logging has destroyed nearly all the virgin forest of Nagaland within a short span of time. Consumption of firewood has increased both in rural and urban because of the population growth. There is no alternative source of energy in the villages. The rate of tree felling has increased tremendously.

Trees felled for firewood to use as a source of energy for cooking and heating

Forest Economics

Forest economics has been the most important economic subsistence source of humans throughout the ages. One of the best examples of this is the use of timber.

Trees cut down in large scale for timber production

For instance, to harvest timber and to create commercial items from this harvest, such as paper, furniture, and homes, is the common and very well-known example. There is ample global supply for the foreseeable future, and although there is a worldwide trend towards deforestation, it is generally due to clearing land for agriculture rather than logging for timber. Nevertheless, illegal logging remains a concern. Illegal logging, which is illegal ranging from forest ecosystem and industries to timber and non-timber forest products seriously threaten the forests.

IMPACTS OF DEFORESTATION

Climate change

Deforestation can result in more carbon dioxide being released into the atmosphere. That is because trees take in carbon dioxide from the air for photosynthesis, and carbon is locked chemically in their wood. When trees are burned, this carbon returns to the atmosphere as carbon dioxide. With fewer trees around to take in the carbon dioxide, this greenhouse gas accumulates in the atmosphere and accelerates global warming.

It is essential to distinguish between microclimates, regional climate and global climate while assessing the effects of forest on climate (Gupta et al., 2005) especially the effect of tropical deforestation on climate (Dickinson, 1981). Deforestation can change the global change of energy not only through the micrometeorological processes but also by increasing the concentration of carbon dioxide in the atmosphere (Pinker, 1980) because carbon dioxide absorbs thermal infrared radiation in the atmosphere. Moreover, deforestation can lead to increase in the albedo of the land surface and hence affects the radiation budget of the region (Charney, 1975; Rowntree, 1988; Gupta et al., 2005). Deforestation affects wind flows, water vapour flows and absorption of solar energy thus clearly influencing local and global climate (Chomitz et al., 2007). Deforestation on lowland plains moves cloud formation and rainfall to higher elevations (Lawton et al., 2001). Deforestation disrupts normal weather patterns creating hotter and drier weather thus increasing drought and desertification, crop failures, melting of the polar ice caps, coastal flooding and displacement of major vegetation regimes. In the dry forest zones, land degradation has become an increasingly serious problem resulting in extreme cases in desertification (Dregne, 1983). Global warming or global change includes anthropogenically produced climatic and ecological problems such as recent apparent climatic temperature shifts and precipitation regimes in some areas, sea level rise, stratospheric ozone depletion, atmospheric pollution and forest decline. Tropical forests are shrinking at a rate of about five per cent per decade as forests are logged and cleared to supply local, regional, national and global markets for wood products, cattle, agricultural produce and biofuels (Anon., 2007; 2010). One of the most important ramifications of deforestation is its effect on the global atmosphere. Deforestation contributes to global warming which occurs from increased atmospheric concentrations of greenhouse gases (GHG) leading to net increase in the global mean temperature as the forests are primary terrestrial sink of carbon.

Loss of Biodiversity

Biodiversity, the diversity of life on Earth, is essential to the healthy functioning of ecosystems. Habitat loss and over-exploitation, driven by our rapid population growth and unsustainable consumption patterns, are the primary causes of biodiversity loss which is now happening upto ten thousand times faster than million of years before.

Deforestation also threatens the world's biodiversity. Tropical forests are home to great numbers of animal and plant species. When forests are logged or burned, it can drive many of those species into extinction.

Forests contain some of the richest concentrations of biodiversity on the planet. But between 1990 and 2020, around 420 million hectares of mainly tropical forest has been lost and a further 10 million hectares, is being lost each year. Without the shelter, food and water, thousands of species that coexist within and beneath the canopy of trees also vanish. Forests are home to a huge array of different tree, amphibian, bird and mammal species but they are facing a combination of threats.
More than three-quarters of the world's documented land-based species can be found in forests. When species lose their forest homes, they are often unable to survive in the small fragments of forested land left behind. They become more accessible to hunters and poachers, their numbers begin to dwindle and some eventually go extinct.

Increased greenhouse gas emissions

Forests are carbon sinks and therefore, help to mitigate the emission of carbon dioxide and other greenhouse gases. Tropical forests alone hold more than 228 to 247 gigatons of carbon, which is more than seven times the amount emitted each year by human activities.

But when forests are cut, burned or otherwise removed they emit carbon instead of absorb carbon. Deforestation and forest degradation are responsible for around 15% of all greenhouse gas emissions. These greenhouse gas emissions contribute to rising temperatures, changes in patterns of weather and water, and an increased frequency of extreme weather conditions.

Increased in Soil Erosion

Deforestation is a major cause of soil erosion, perhaps the main cause. Trees and their roots provide the soil with an anchor, as well as shelter from the wind and rain. When forests are wiped out, the land becomes exposed, leaving it vulnerable to being washed or blown away by elements. While the slash and burn technique of deforestation introduces significant volumes of carbon dioxide into the atmosphere it has become popular due to its speed and cost-effectiveness at clearing an area. This technique in particular leaves soils vulnerable to the wind and rain, acting as a major contributor to soil erosion.

Remedial Measures

- Intensive development schemes for afforestation should be adopted and high yielding varieties should be planted in suitable areas.
- A thorough inventory of forest resources is necessary to make an accurate assessment of our forest resources and make plans for their proper use.
- Shifting cultivation should be discouraged and tribals depending on this type of cultivation should be provided with alternative sources of livelihood.
- Plantation of trees, creation and maintenance of natural parks and greenery should be made a priority in urban areas.
- Participation of local government and community should be encouraged for better management of forest.
- Cultivation and management of bamboo forests should be encouraged.
- Fuel wood continues to be the predominant source of energy in rural areas. To meet the requirement, afforestation programmes should be intensified with special emphasis on plantation in degraded areas so as to decrease pressure on natural forests
- A need based and time bound programme of regeneration, afforestation and tree planting, with particular emphasis on fuel wood, timber and bamboo, on the degraded forest land may be introduced in the state.
- Human activities and developmental projects which adversely affects forests that covers steep slopes, catchment areas of rivers, lakes and reservoirs, geologically unstable terrain and such other ecologically sensitive areas should be restricted.
- Proper measures to save forests from fires and plant diseases can go a long way to solve several problems.

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