The research papers published in this book entitled **'Environmental Challenges Today: Global Perspective'** cover almost all the aspects of environmental concerns and possible measures to be adopted by the people. It covers Local issues, literary references, and National as well as International issues regarding Environment. This book will be a good source of reference for the students, teachers and policy makers. The contributors have really made genuine attempt to come with the best possible remedies regarding the issues which will contribute in reshaping the sensibilities of the new generation.

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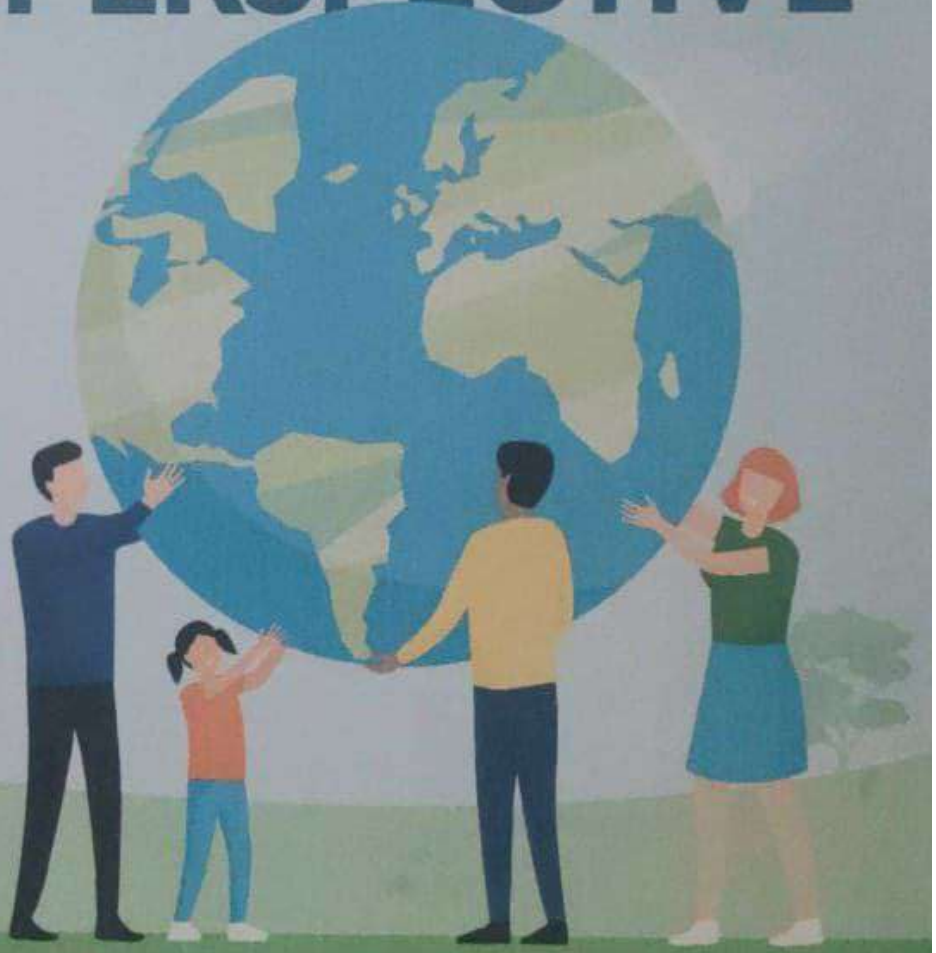

V.D. SATPUTE, M.B. PATIL, S.A. TENGSE

Global Warming: Causes, Effects Warning the Tragedy in Australia with Reference to Bushfires as Consequences of Climate Change

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GLOBAL WARMING

Global warming is also known as climate change which is defined as gradual or contemporary increase in average temperature of the earth's atmosphere due to change in the climate on earth. Term "global warming"is usually applied exclusively to the observed rapid global temperature rise during the last 100–150 year's which is believed to be related to an anthropogenic enhancement of greenhouse effect.

Causes

Global warming is mainly caused by two types of factors one is natural and other is human influences. Natural causes mainly contributing to the global warming are rotation of the sun that changes the intensity of sunlight and moving closer to the earth, greenhouse gases and volcanic eruption and human influences that contribute to the global warming are mainly industrial revolution, deforestation and mining etc.

Effects

Climate change adversely affected the life on the earth due to heat waves, droughts, heavy rainfall with floods, heavy snowfall, ocean acidification, ozone depletion etc.

BUSHFIRES: A TRAGEDY IN AUSTRALIA

In this article presented the survey related how the tragedy of fire accident in Australia alarms the rise of surface temperature due to an anthropogenic enhancement of greenhouse effect. Australia has always experienced bushfires – it has a "fire season." But this year they are a lot worse than normal. Fires are usually caused by lightning strikes or accidentally by a spark – but some fires are also started deliberately.

Major conflagrations include the 1851 Black Thursday bushfires, the 2006 December bushfires, the 1974–75 fires that burned up 15% of Australia, and the ongoing 2019–20 bushfires. In January 2020, it was estimated that over 1.25 billion animals have died in the 2019–2020 Australian bushfire season.

What is a Bushfire?

Bushfires and grassfires are common throughout Australia. Grassfires are fast moving, passing in five to ten seconds and smouldering for minutes. They have a low to medium intensity and primarily damage crops, livestock and farming infrastructure, such as fences. Bushfires are generally slower moving, but have a higher heat output. This means they pass in two to five minutes, but they can smoulder for days. Fire in the crown of the tree canopy can move rapidly.

Where do Bushfires Occur?

The Australian climate is generally hot, dry and prone to drought. At any time of the year, some parts of Australia are prone to bushfires. The widely varied fire seasons are reflected in the continent's different weather patterns. For most of southern Australia, the danger period is summer and autumn. For New South Wales and southern Queensland, the peak risk usually occurs in spring and early

summer. The Northern Territory experiences most of its fires in winter and spring.

Australia is fighting one of its worst bushfire seasons, fuelled by record-breaking temperatures and months of severe drought. Every state and territory in Australia has experienced fires this summer. But the biggest fires burn along stretches of the eastern and southern coast, where most of the population lives. More than 6.3 million hectares (63,000 sq km or 15.6 million acres) have been burned so far – one hectare is roughly the size of a sports field.

But the overwhelming scientific consensus is that rising levels of CO_2 are warming the planet. And Australia has been getting hotter over recent decades and is expected to continue doing so.

This year, Australia twice set a new temperature record: an average maximum of 41.9C was recorded on 18 December. That comes on top of a long period of drought. Scientists have long warned that this hotter, drier climate will contribute to fires becoming more frequent and more intense.

The more extreme weather patterns and higher temperatures increase the risk of bushfires and allow them to spread faster and wider (www.bbc.com, 7th Jan 2020)

Effect of Bushfires

Australia twice set a new temperature record: an average maximum of 41.9C was recorded on 18 December.

The amount of land affected across the country – more than 10 million hectares – is now comparable to England's land area of 13 million hectares.(www.bbc.com)

There have been fires in every Australian state, but New South Wales was hardest hit, with smoke so bad in

Sydney in December that air quality measured 11 times the "hazardous" level.

The blazes have damaged World Heritage Areas, including the Blue Mountains and the Gondwana rainforests in New South Wales and Queensland, according to Australian authorities.

The Environment Department this week released a list of 113 species considered to be at risk, including 13 birds, 19 mammals, 20 reptiles, 17 frogs, five invertebrates, 22 crayfish and 17 fish species.

(Edition.cnn.com)

Data shows that Australia has warmed overall by slightly more than one degree Celsius since 1910, with most of the heating occurring since 1950, the Bureau of Meteorology says.

Causes of Fires

The main bushfire incidents that are continued from 1851 Black Thursday bushfires till 2019 are mainly caused due to following reasons.

The latest figures from Australia's Bureau of Meteorology show 2019 wasRecord-breaking temperatures and months of drought have helped the fires burn an estimated 10 million hectares (100,000 sq km) of land since 1 July. The conditions were caused by a climate phenomenon called a positive Indian Ocean Dipole (IOD), which was unusually strong, a rare Sudden Stratospheric Warming event, which pushed weather systems northward, as well as climate change.

Last year's annual mean temperature was 1.52 degrees Celsius above the 1961–1990 average of 21.8C – higher than the previous record of 1.33 degrees Celsius in 2013.

Factors Responsible for Bushfires

The basic factors which determine whether a bushfire will occur include the presence of fuel, oxygen and an ignition source. The fire intensity and speed at which a bushfire spreads will depend on ambient temperature, fuel load, fuel moisture, wind speed.

Fuel Load

Fuel load describes the amount of fallen bark, leaf litter and small branches accumulating in the landscape. Generally speaking, the greater the fuel load, the hotter and more intense the fire. Fuel which is concentrated but loosely compacted will burn faster than heavily compacted or scattered fuel sources. Smaller pieces of fuel such as twigs, leaf litter and branches burn quickly, particularly when they are dry and loosely arranged and will burn quickly in the fire front. Larger fuels, such as tree trunks often burn later after the fire front has passed. The natural oil within eucalypt trees promotes the combustion of fuel.

Fuel Moisture

Dry fuel will burn quickly, but damp or wet fuel may not burn at all. As a consequence, the time since rainfall and the amount of rain received is an important consideration in assessing bushfire danger. Often a measure of the drought factor, or moisture deficit, will be used as an indicator of extreme bushfire weather conditions.

Wind Speed

Wind acts to drive a fire by blowing the flames into fresh fuel, bringing it to ignition point and providing a continuous supply of oxygen. Wind also promotes the rapid spread of fire by spotting, which is the ignition of new fires by burning embers lofted into the air by wind. Spotting can occur up to 30km downwind from the fire front.

There is a threshold wind speed of around 12 to 15 km/h which makes a significant difference in the behaviour of bushfires in the open.

AMBIENT TEMPERATURE

The higher the temperature the more likely it is that a fire will start or continue to burn. This is because the fuel is closer to its ignition point at high temperatures and pre-heated fuel loads burn faster.

RELATIVE HUMIDITY

Dry air promotes a greater intensity fire than moist air. Plants become more flammable at a low humidity because they release their moisture more easily.

IGNITION SOURCE

Bushfires can originate from both human activity and natural causes with lightning the predominant natural source, accounting for about half of all ignitions in Australia. Fires of human origin currently account for the remainder and are classified as accidental or deliberate.

Unfortunately deliberate and accidentally lit fires are more prevalent near populated areas and have a disproportionately higher risk of infrastructure impact.

CONCLUSION

Bushfires have caused loss of life and significant damage to property. While bushfires naturally occurring cannot be prevented butits consequences can be minimised by implementing mitigation strategies and reducing the potential impact to areas which are most vulnerable

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