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VISIONIAS
INSPIRING INNOVATION

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THE PLANET VISION

Breathless Cities: Tackling the Menace of Air Pollution

Air pollution causes an estimated 7 million premature deaths every year

From the Editor's Desk

Driven by the belief that empowered youth are the key to a sustainable future, team **VisionIAS** is launching **"The Planet Vision".** The magazine seeks to connect the general public with pressing environmental issues and **sensitise the young generation** regarding the environment, nature & planet.

'The Planet Vision' magazine is a **simplified, informative, and interactive resource** to delve into the complexities of the environment. Whether you're a seasoned environmentalist or curious learner, the magazine seeks to educate and inspire people to become more environment- conscious.

The magazine includes **thought-provoking articles** delivering information about the ongoing environmental issues along with the mitigation strategies adopted at the national and international levels.

It also includes different sections on current affairs and **local conversation efforts** as well as environmental briefings and developments. In addition, it challenges your knowledge with interactive quizzes and crosswords. Most importantly, it offers **inspirational stories** and **case studies** that motivate people to make **environmentally conscious choices** in their everyday lives.

This magazine isn't just about facts and figures, it's about cultivating a deep environmental awareness and sensitivity. It helps to **reconnect with nature,** understand its delicate balance, and recognise our own role in maintaining this balance.

Happy Learning.

Team VisionIAS

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Breathless Cities: Tackling the Menace of Air Pollution

As factories continue to churn out pollutants, cities worldwide face a perilous battle against smog and its detrimental effects on public health and the environment

In the relentless march of progress, our cities have emerged as bustling hubs of innovation, culture, and economic activity. However, amid glittering skylines and the ceaseless hum of urban life, a silent adversary looms - air pollution. The air we breathe, once pure and invigorating, has become tainted by a complex concoction of pollutants, posing a grave threat to both human health and the environment.

Let us explore the far-reaching consequences of air pollution, delving into its causes, effects, and urgent need for comprehensive solutions to reclaim the air we share.

Something in the Air

We take a breath every 3 seconds that sums up to 28000 breaths every day. But in major cities around the world, it is getting harder to breathe, with pollution looming as an invisible threat. Air pollution is a global crisis, affecting around 90 % of the world's population. China and India are two countries suffering the most from poisonous smog, meaning that billions of people live in cities that are permanently unhealthy.

> If we talk about Delhi alone, breathing in its average air quality in the last few years, has been equated to smoking 20 to 25 cigarettes a day.

Air pollution has become part of their everyday life. One can smell it, and one can taste it, and it leaves a chemical taste on the tongue, and it stings eyes. According to some estimates, outdoor air pollution from all sources accounts for 2.18 million deaths per year in India. The situation is worst in the cities. If we talk about Delhi alone, breathing in its average air quality in the last few years, has been equated to smoking 20 to 25 cigarettes a day. This is leading to some alarming consequences. Let's look at what makes Delhi - the city where air pollution has become a perennial issue – so unique.

A plume of smoke rises above paddy fields in Punjab. Farmers are tired of taking the blame for Delhi's pollution, with no viable alternative to stubble burning

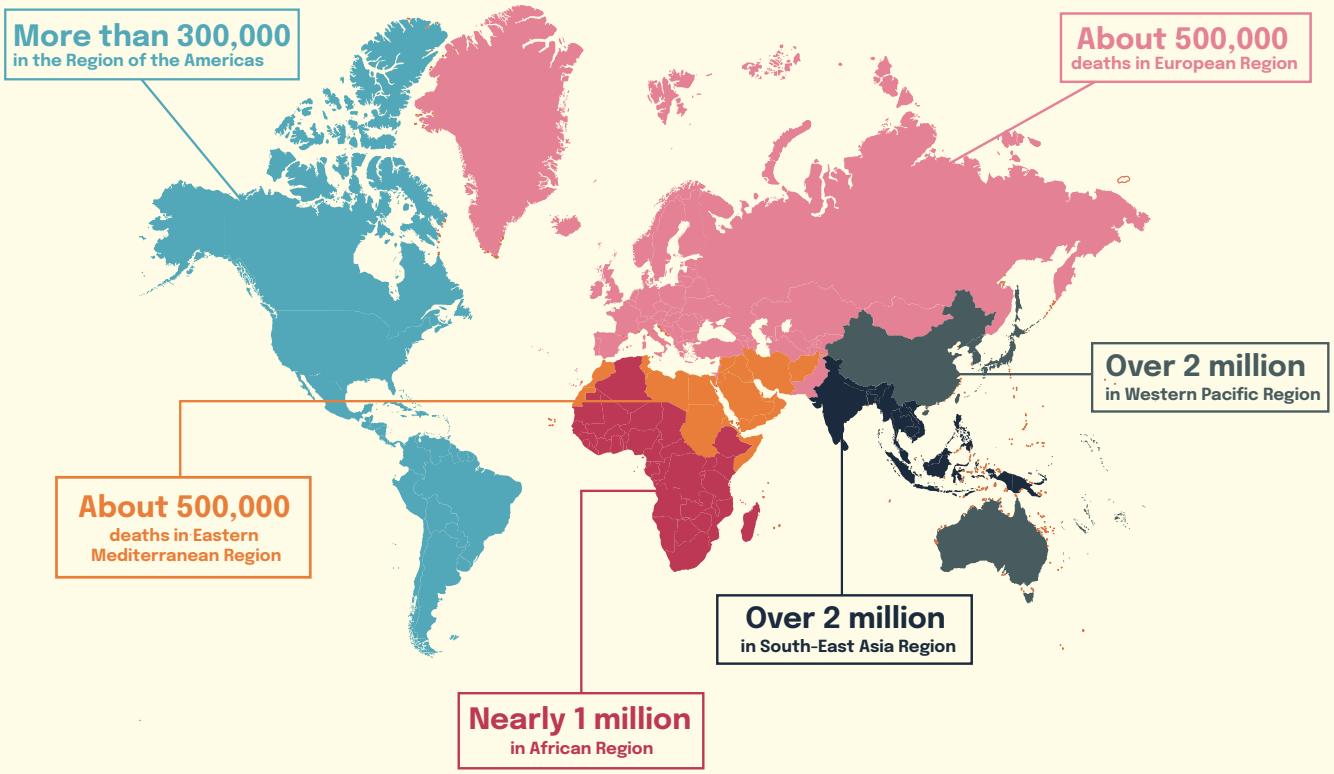
AIR POLLUTION – THE SILENT KILLER

Every year, around **7 MILLION DEATHS** are due to exposure from both outdoor and household air pollution.

Air pollution is a major environmental risk to health. By reducing air pollution levels, countries can reduce:

- Stroke
- Heart disease
- Lung cancer, and both chronic and acute respiratory diseases, including asthma

REGIONAL ESTIMATES ACCORDING TO WHO REGIONAL GROUPINGS:



Winter is coming! Premonition of the Past

"Winter is coming" is a famous phrase from the fantasy series "Game of Thrones," which is based on George R. R. Martin's "A Song of Ice and Fire" novels. The phrase serves as a warning about impending challenges and hardships. On a similar note, winter in Delhi is often associated with a challenge of significant increase in air pollution levels. The months of October to January, particularly after Diwali, see a spike in pollution levels due to a combination of factors like burning of crop residue, weather conditions and vehicular emission.

A distinctive role is played by a phenomenon known as temperature inversion. When winter arrives in Delhi, the nights become longer and cooler. During these cold nights, the ground loses heat, and the air near the surface becomes colder. Now sometimes, a layer of warmer air traps the colder air near the ground. When this happens, the warm layer acts like a lid, preventing the cold air and pollutants near the ground from rising and dispersing. As a result, pollutants from vehicles, industries, and other sources accumulate close to the ground, creating a hazy and polluted atmosphere. This trapped pollution is what we commonly experience as winter smog.

Moreover, as demands for heat increase with colder weather, leading to a surge in energy use. For example, one may leave his car idling while it warms up or run his home's heater longer. What is concerning is that most cars, houses and businesses rely on fossil fuels for energy. This is particularly true in developing countries, in which it is common to burn coal and garbage for energy. This increase in burned fossil fuels, garbage and coal emits toxic air pollutants.

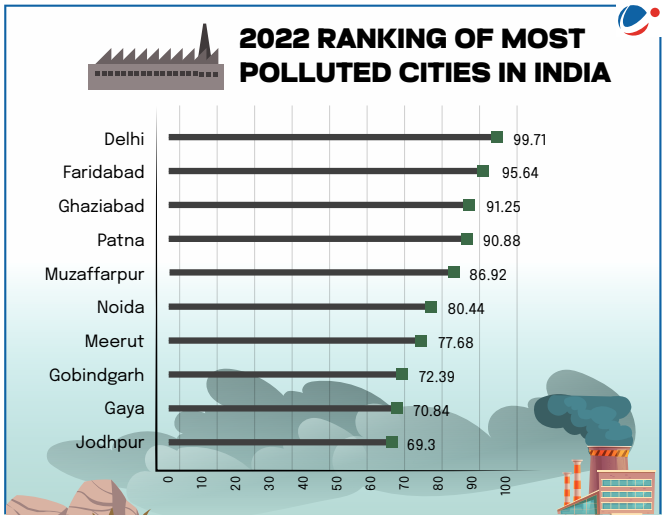
Season of Smog: Not just Delhi, Many Indian Cities are Suffering

One thing is clear here that due to several factors, Delhi has been struggling to safeguard its air quality. But get this - in 2023, the financial capital of India i.e. Mumbai's air quality was worse than Delhi's! Between January 1 and February 17, the AQI in Mumbai remained higher than that of Delhi's for 12 days. For long, Mumbai was mainly considered immune to the issue of air pollution, and the associated problems of haze and smog, thanks to its coastal location. Strong sea breezes would blow dust and other suspended particles away, keeping the city's air relatively clean.

While several reasons are associated with the recent situation of Mumbai's air quality, the primary cause is the dust arising from construction sites. Other major causes are climate change, road dust and its displacement, usage of unclean fuels in restaurants, dhabas, bakeries and roadside eateries, and open burning of solid waste and garbage.

It is clear that air pollution respects no geographical boundaries. Besides Delhi, UP, Punjab, Haryana, Rajasthan, and Bihar have seen the worst of air pollution in recent decades. The World Air Quality Report released by the Swiss organisation IQAir in March 2022 lists 35 Indian cities as the 50 most polluted cities in the world.

> Pollution doesn't respect state boundaries, so addressing it requires collaboration between different states and sectors



Source: National Clean Air Programme (NCAP) Tracker

Why should we care?

Air pollution is a primary concern of new civilized world, which has a serious toxicological impact on human health and the environment. The impacts are devastating, including the degree of particulate matter concentrations in the air, detrimental effects on the local ecosystem, affecting plants, animals, and aquatic life (environmental), reduction in life expectancy (health), and high costs that the state is incurring to resolve the crisis (economic).

Severe air pollution has a significant impact on daily life. The constant presence of smog diminishes the overall quality of life by limiting the enjoyment of outdoor spaces and social activities. People often have to restrict or avoid outdoor pursuits like exercise and walks during periods of heavy smog. Schools may be temporarily closed, causing educational disruptions. Reduced visibility also increases the risk of accidents for drivers and pedestrians, leading to traffic disruptions. Moreover, higher respiratory problems result in increased healthcare costs for individuals and the government. Continuous exposure to poor air quality can also induce stress and anxiety, particularly concerning its long-term effects on health, especially for vulnerable populations like children and the elderly.

Unity can save the Earth

The air pollution problem in India is complex, involving multiple sectors and jurisdictions. So, addressing it requires collaboration between different states and sectors. The central Government alone cannot effectively reduce pollution without working together with neighbouring states. So what has the government at the national and state level been doing to tackle this menace. Let's have a look!

Fighting Together

The story of fighting pollution started forty years ago when India passed the Air (Prevention and Control of Pollution) Act 1981, the first major central legislation to tackle the air pollution problem in India. At the time of enactment, air pollution was starting to get recognized as a credible threat in major cities in India and was being attributed entirely to industrial and transportation sources. The problem has taken on a new form today, with several more sources like household emissions, road and construction dust, and biomass burning getting acknowledged for their contributions.

The protagonist of this story was the National Clean Air Program (NCAP), a beacon of hope launched in 2019. With a mission to purify the air in 122 cities, the NCAP set ambitious targets and inspired cities to craft their unique action plans. The program believed in the power of communities, emphasizing public participation to make a collective difference.

Meanwhile, in the heart of the nation, i.e. in Delhi NCR, the Graded Response Action Plan (GRAP) emerged as a guardian during critical times. When the air quality index soared, GRAP activated emergency measures like pausing construction activities, regulating industrial emissions, and restricting vehicle movement. It is a knight in shining armour, ready to protect the citizens from the onslaught of pollution. Moreover, Electric vehicles (EVs) are championing the cause of clean mobility.

In the villages, the Pradhan Mantri Ujjwala Yojana lit the flame of progress. By providing clean cooking fuel to rural households, it curbed indoor air pollution, protecting families and creating a ripple of change in the heart of the nation.

While significant strides have been made, challenges persist, and sustained efforts are required to combat air pollution effectively. The First obstacle arose from the sheer magnitude of the issue. With a rising population and rapid urbanization, controlling emissions from vehicles, industries, and households became an intricate puzzle. The battle against air pollution required a delicate balance between development and environmental stewardship. Electric vehicles (EVs), face their own set of challenges. The need for robust charging infrastructure, affordability concerns, and the transformation of consumer mindsets proved to be barriers to widespread adoption. Overcoming bureaucratic hurdles, enforcing stringent standards, and monitoring vast territories required reimagining regulatory frameworks.

Ahead of the Curve: Navigating Tomorrow's Possibilities

The future outlook for the solution of air pollution problems in India's cities will likely involve a combination of policy interventions, technological advancements, public awareness, and community participation. Several cities and countries worldwide have implemented successful strategies to curb air pollution, showcasing positive outcomes in terms of improved air quality and public health. India can learn from global success stories like stringent Emission Standards in Tokyo, and Berlin's efficient public transportation system. Along with the creation of green spaces, efforts in these cities have reduced the impact of vehicular emissions and improved the overall air quality.

Going forward, collaboration between the government, industries, communities, and individuals remains crucial in achieving substantial and lasting improvements in air quality across India. Pressure on politicians from the masses is needed to drive better environmental policies. Overall, community engagement and awareness campaigns create a bottom-up approach to tackling air pollution, empowering individuals and communities to actively contribute to a cleaner and healthier environment. These efforts can lead to sustainable solutions and long-term positive outcomes when combined with supportive policies and regulatory frameworks.

Finally, the pervasive issue of air pollution, exemplified by the alarming levels in Delhi and other urban cities of India, necessitates urgent attention and comprehensive strategies. The health impacts are undeniable, with far-reaching consequences for the well-being of the population. While commendable measures have been taken to address this crisis,

challenges persist, demanding innovative solutions. The way ahead requires a collaborative and multi-pronged approach, involving government interventions and active participation from citizens, industries, and neighbouring regions.

We all have contributed to air pollution, let's now contribute for clean air

Only through collective efforts can we hope to mitigate the detrimental effects of air pollution, safeguard public health, and pave the way for a cleaner and sustainable future.

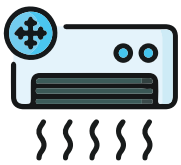
Do's and Don'ts to Curb Air Pollution

From smog-choked streets to hazy horizons, air pollution casts a long shadow. But amidst the gloom, hope blooms in the form of you. Embrace green living, and reclaim clean air, by making these slight adjustment in your lifestyle!

Do's

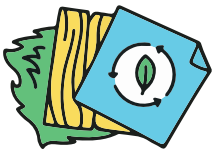
Embrace active commuting: Walk, cycle, or use public transportation whenever possible.

Maintain your vehicle: Regularly service your car and maintain proper tire pressure to improve fuel efficiency and emission control.



Conserve heating and cooling: Dress appropriately for the weather, use ceiling fans, and adjust thermostat settings to minimize energy consumption

Choose sustainable products: Opt for products with low environmental impact and minimal packaging.



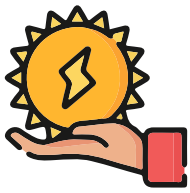
Avoid using aerosols and other household products that contain volatile organic compounds (VOCs), which contribute to ozone formation.

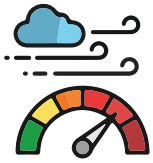
Don'ts

Stay away from driving during peak traffic hours.

Don't drive aggressively. Rapid acceleration and braking increase emissions.

Don't use inefficient appliances and heating systems. Opt for energy-efficient models and maintain them properly to reduce emissions.





Don't ignore air quality alerts. Take steps to protect yourself and others when air quality is poor.

Don't water your lawn during the hottest part of the day. This can lead to increased evaporation and air pollution.

Remember, even small changes in every day habits can make a significant difference in mitigating air pollution. By working together, we can create a cleaner and healthier environment for everyone.

Smoke Signals: The Stubborn Stubble Burning Crisis

A farmer sets his crop residue ablaze in Punjab. Farmers have their hands tied, as early-maturing seeds and affordable equipment are yet to make their way to them in time.

Every year, as vibrant hues of autumn fade, heralding the arrival of winter in Northern India, a shadow descends upon the India's national capital and adjoining region, shrouding it in an unsettling haze. In this annual drama, the fields of Punjab and Haryana, once adorned with the golden remnants of a fruitful harvest, become both the protagonists and the antagonists in a tale of environmental contradiction.

Stubble burning, especially in the months of October-November, has become an issue of grave concern in view of its direct contributions to the Air Quality degradation in the National Capital Region (NCR) and adjoining areas.

Agriculture Dilemma

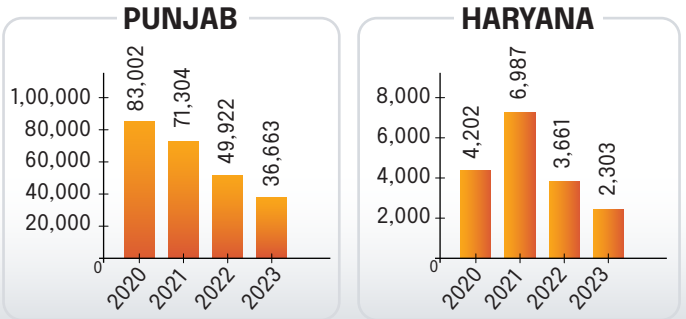
One of the major reasons behind the stubble burning is the short time available between paddy harvesting and sowing of wheat. In the rice-wheat cropping pattern, paddy crops are harvested around November and the time of sowing for succeeding wheat crop is first fortnight of November. This effectively leaves no time for farmers to properly manage of rice straw.

> After the Green Revolution, paddy cultivation expanded from a mere 7.1% of cropped area in 1973 to around 36% in 2013 in Punjab.

To understand the reasons for the availability of short time, there is a need to understand the changes in the cropping pattern in Punjab and Haryana region over the past few decades. Paddy was not an important crop in Punjab in the pre-Green Revolution era. However, after the Green Revolution, paddy cultivation expanded from a mere 7.1% of cropped area in 1973 to around 36% in 2013 in Punjab.

On the decline

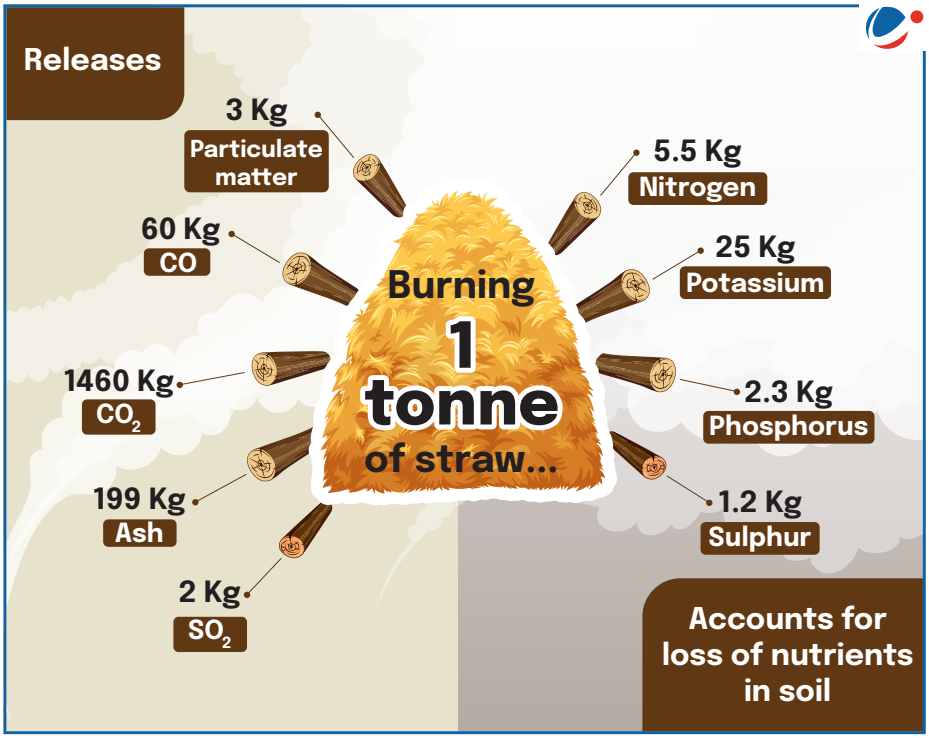
- **According to official data, farm fires in Punjab and Haryana**



• Crop residue being burnt in Haryana's Rohtak on the final day of the harvesting season.

Source - Commission for Air Quality Management

Further, the procurement of paddy at the minimum support price (MSP) also helped to popularise it. In turn, the high water-intensive paddy shrunk Punjab's water table rapidly.



Source - Commission for Air Quality Management

To protect the rapidly shrinking groundwater levels, the Punjab and Haryana governments notified their respective Preservation of Sub-soil Water Act of 2009. These acts prohibited nursery sowing and transplanting paddy until May 15 and June 15, respectively in Haryana, and May 10 and June 16, in Punjab.

> After the Green Revolution, paddy cultivation expanded from a mere 7.1% of cropped area in 1973 to around 36% in 2013 in Punjab.

This delayed sowing led to delayed harvesting and left very little time to ready soil bed for sowing wheat, forcing farmers to burn paddy residue in the field.

Another important factor for the high prevalence of stubble burning is the use of mechanical harvesters. Rice being the most important cereal crop and produced in large areas, the usage of manpower for harvesting is extravagant. Consequently, mechanical harvesters came into existence in which combine harvester is prominently used. This leaves a significant amount of straw in the field itself since it is not designed to cut the plant to the surface.

Lack of alternate usage of paddy straw also results in burning of stubble. Most of the cereal and forage crop residue is used in dairy as a feed for cattle. However, paddy straw is not preferred as cattle feed due to increased silica, lignocellulose and limited protein content (2-7%). Moreover, lack of knowledge in stubble management among farmers, scarcity of labour and high labour costs needed for manual removal are cited as other common reasons for stubble burning.

Why should I care?

Burning crop residues can produce greenhouse gases and other chemically and radioactively significant trace gases and aerosols, including methane, carbon monoxide, nitrous oxide and other hydrocarbons. Moreover, the burning of agricultural waste also produces large amounts of particulate matter, which contains a wide variety of organic and inorganic compounds. The majority of the contaminants present in large amounts in biomass smoke are confirmed or suspected carcinogens that can cause various lung diseases when inhaled.

Further, the impact of stubble burning on the atmosphere is directly proportional to the impact on human wellbeing. This is because all the heavy metals or lethal gases released as a result of residue burning damage the ozone or cause environmental pollution and act as slow poison in human body. Further, fine particulate matter (PM2.5) shows more effect on humans as it can pass through the trachea, through the lungs, and then through the bloodstream, causing long-term damage.

Stubble burning on the farm also affects soil fertility and properties. The Heat from burning residues elevates soil

Chandigarh Startup Develops Machine to Turn Stubble Into Biofuel

temperature causing death of beneficial soil organisms. Frequent residue burning leads to complete loss of microbial population and reduces level of Nitrogen and Carbon in the top layers of the soil profile, which is important for crop root development. It also hampers agricultural productivity because pollutants in the atmosphere lead to acid rain and prolonged exposure to particulate pollution favours growth of pests or diseases.

Green Harvest Solutions

To address this pressing environmental challenge, various state and non-state stakeholders have undertaken various measures at different levels.

Union Ministry of Agriculture, in 2014, developed the National Policy for Management of Crop Residue to prevent agricultural residue burning. Policy aimed to promote technologies for optimum utilization and in situ management of crop residues, satellite-based technologies to monitor crop residue management, among others.

Further, the Indian Agriculture Research Institute has devised a radical solution for stubble burning in the form of a bio-enzyme called PUSA Decomposer. When sprayed, this enzyme decomposes the stubble in 20-25 days, turning it into manure, further improving the soil quality. It increases organic carbon and soil health while significantly reducing the fertilizer expense for the next cropping cycle.

In the world of innovation, Indian startups are also offering new ideas to deal with stubble burning. For instance, Delhi-based Dharaksha Ecosolution makes biodegradable materials from agricultural waste that can effectively replace Thermocol. Similarly, Pune-based BiofuelCircle provides an online marketplace connecting rural farming communities with industrial producers for selling biomass and associated commodities like biofuel, biofertilizers and biogas.

Other potential solutions that have been pitched to tackle this persistent problem include diversifying crops sown on the fields and utilizing crop waste for bio-methanation under a waste-to-energy progamme. Farmers can also opt for composting and produce bio-char to sustainably manage stubble. These measures could not only manage the crop residues but also help in control GHG emissions.

Sustainable alternatives, such as mechanical solutions and government initiatives, offer promising avenues for addressing this crisis. As we strive for a more sustainable and environmentally conscious future, farmers, policymakers, and the community must come together to find viable solutions and break free from the destructive cycle of stubble burning. The time to act is now for the sake of our environment and the well-being of future generations. Only through concerted efforts can we cultivate a future where the spectre of stubble burning fades, giving rise to a resilient and sustainable agricultural landscape.

As we navigate through the complexities, innovative solutions must take center stage, bridging the gap between traditional farming practices and sustainable alternatives. It is imperative for stakeholders, including farmers, policymakers, and environmentalists, to collaborate on implementing effective measures.

Piercing Through the Smog: Unravelling the Health Implications of Air Pollution

A woman inspecting her husband's x-rays. She had to show his reports to six doctors before she found out her husband, a non-smoker, had lung cancer

From smog hanging over cities to smoke inside homes, air pollution poses a major threat to health across the globe. Almost all global populations (99%) are exposed to air pollution levels that increase their risk for diseases. WHO estimates that around 7 million people die every year from exposure to fine particles in polluted air that lead to diseases such as stroke, heart disease, lung cancer, chronic obstructive pulmonary diseases (COPD) and respiratory infections, including pneumonia. Further, the concerning thing is that it disproportionately affects women, children and the elderly.

> "Exposure to pollutants like PM2.5 and NO_2 increases the risk of heart attacks, strokes, and other cardiovascular diseases"

The Culprit: Understanding Air Pollutants

WHO considers Particulate Matter (PM), Carbon Monoxide (CO), Ozone (O_3), Nitrogen Dioxide (NO_2) and Sulfur Dioxide (SO_2) as pollutants of major public health concern. Both ambient (outdoor) and household (indoor) air pollution are harmful for health. Industry, transportation, coal power plants and household solid fuel usage are major contributors to air pollution.

Respiratory Health: A Direct Assault

Prolonged exposure to air pollution has an immediate and pronounced impact on the respiratory health of humans. Fine particulate matter, particularly PM2.5, infiltrates deep into the lungs, triggering inflammation and exacerbating asthma and COPD. According to WHO, globally, air pollution is estimated to cause about 29% of lung cancer deaths, 43% of COPD deaths, about 25% of ischemic heart disease deaths and 24% of stroke deaths.

Cardiovascular Implications: A Silent Threat

Recent research has unveiled a sinister connection between air pollution and cardiovascular health. Exposure to pollutants like PM2.5 and NO_2 increases the risk of heart attacks, strokes, and other cardiovascular diseases. These pollutants induce inflammation, impair blood vessel function, and contribute to arterial plaque formation, collectively elevating the likelihood of adverse cardiovascular events. It can also affect the heart's electrical system, which controls heartbeat, resulting in abnormal heart rhythms. Further, it also has the potential to alter the structure of human heart, similar to changes seen in early stages of heart failure.

Beyond Respiratory and Cardiovascular Health:

Antibiotic Resistance

According to a global study published in the Lancet Planetary Health Journal, Air pollution is helping to drive a rise in antibiotic resistance that poses a significant threat to human health worldwide. Antibiotic resistance is a situation when disease-causing bacteria become uniquely immune to drugs. Researchers found that for every 10% rise in air pollution, there was an increase in antibiotic resistance of 1.1% across countries and continents. Further, if air pollution continues unabated, by 2050, antibiotic resistance could increase by 17%, subsequently causing almost 8,40,000 premature deaths annually.

Diabetes

In a recent study published in medical journal BMJ, researchers found that one month of exposure to PM2.5 led to elevated levels of blood sugar and prolonged exposure of one year or more led to increased risk of diabetes. They found for every 10µg/m3 increase in annual average PM2.5 level in the cities of Delhi and Chennai, the risk for diabetes increased by 22%. Further, the association between air pollution and diabetes is stronger for traffic associated pollutants, nitrogen dioxide, tobacco smoke and particulate matter. Air pollution is a leading cause of insulin resistance and incidence of type 2 diabetes.

> Children often spend more time outdoors engaging in physical activities, further increasing their exposure to polluted air

Neurological Disorders

Air-polluting substances could reach the brain via the olfactory tract, the gastro-intestinal tract/ vagus nerve, or the blood-brain barrier (BBB). Further, airborne fine PM contains toxic substances such as lead, methyl mercury, arsenic, polychlorinated biphenyls, toluene, etc., which have neurotoxic activity. In this regard, various studies show positive correlation between long-term exposure to air pollution and several neurological disorders, including Parkinson's disease, Alzheimer's disease, and other dementias.

Disproportionate impact on children

Before birth, ambient air pollution increases the risk of babies being smaller during pregnancy, having a low birth weight as well as having an increased risk of pre-term birth. All of these can increase the risk of different health problems later in life. Though the evidence is less clear, particulate matter has also been linked to an increased risk of spontaneous abortion and stillbirths.

After birth, children are uniquely vulnerable to the adverse effects of air pollution due to several factors.

Children covering their faces due to smog

First and foremost, their respiratory and immune systems are still developing, making them more susceptible to environmental stressors. The anatomical differences in children's airways also result in a higher inhalation rate, meaning they breathe in more air (and pollutants) per unit of body weight than adults. Additionally, children often spend more time outdoors engaging in physical activities, further increasing their exposure to polluted air.

Further, fine particulate matter in polluted air has been found to have neurotoxic effects, potentially impairing cognitive function and affecting academic performance. Prenatal exposure to air pollution has also been associated with adverse outcomes, including lower IQ scores and an increased risk of neurodevelopmental disorders.

Breathe Better: Strategies against Air Pollution

Simple yet effective lifestyle changes can significantly contribute to personal adaptation. Indoor air quality, often overlooked, plays a crucial role in respiratory health. Individuals can invest in air purifiers, and proper ventilation to create cleaner living spaces.

Choosing sustainable transportation options is another pivotal step. Opting for bicycles, electric vehicles, or public transit not only reduces personal exposure to pollutants but also contributes to diminishing overall air pollution levels.

Furthermore, wearing protective gear, such as masks designed to filter out particulate matter, becomes increasingly relevant in densely populated areas with elevated pollution levels. These small but conscious choices serve as a shield against harmful airborne particles.

Education remains paramount at the individual level. Understanding the sources and types of air pollutants enables informed decision-making. Additionally, promoting a healthy lifestyle through regular exercise,

balanced nutrition, and staying hydrated strengthens the body's resilience against the adverse effects of pollution.

Air quality is closely linked to the earth's climate and ecosystems globally. Many of the drivers of air pollution (i.e. combustion of fossil fuels) are also sources of greenhouse gas emissions. Policies to reduce air pollution, therefore, offer a win-win strategy for both climate and health, lowering the burden of disease attributable to air pollution as well as contributing to the near- and long-term mitigation of climate change.

By collectively embracing solutions, we can not only safeguard the well-being of current and future generations but also contribute significantly to the overall improvement of air quality and, consequently, public health.

5 Reasons We Need a Global Convention to Eradicate Air Pollution

We all want our human right to breathe clean air to be enforced, for ourselves and our children

A Global Convention to eliminate air pollution is necessary because environmental problems are linked, and we acknowledge that air pollution is a widespread and serious threat with extensive effects. This article looks into the five solid reasons for this urgency, highlighting the shared responsibility of nations to protect the air we all depend on.

1. Interconnectedness of Air Pollution

Air pollution is a global challenge that disregards geopolitical boundaries, with pollutants from one region affecting populations worldwide. A global convention recognizing this interconnectedness, can promote collaboration to address transboundary impacts. Emphasizing shared responsibility for planetary health, a convention will signify the need for nations to unite in a collective effort to combat air pollution. By establishing cooperation and a, countries can jointly address the impacts of pollution, emphasizing that the health of one nation's air is intertwined with the well-being of the entire planet.

2. Establishing Universal Standards

Inconsistency in environmental standards can lead to disparities in pollution control efforts. A global convention can provide a platform to set universal standards for air quality, emission controls, and monitoring protocols. This standardization facilitates effective comparisons, evaluations, and enforcement, ensuring that all nations adhere to a common baseline of environmental responsibility.

3. Preventing countries from becoming "Pollution Havens"

Without global coordination, there is a risk of countries becoming "pollution havens" where industries relocate to evade strict environmental controls. A global convention levels the playing field by discouraging such scenarios promoting fair practices and environmental responsibility across borders.

4. Ensures commitment to Long-Term Environmental Sustainability

Air pollution is intricately tied to the broader goals of environmental sustainability and Sustainable Development Goals. A global convention can ensure that the eradication of air pollution becomes an integral part of long-term sustainability initiatives, emphasizing the importance of preserving the environment for current and future generations.

5. Absence of legally binding convention to curb air pollution

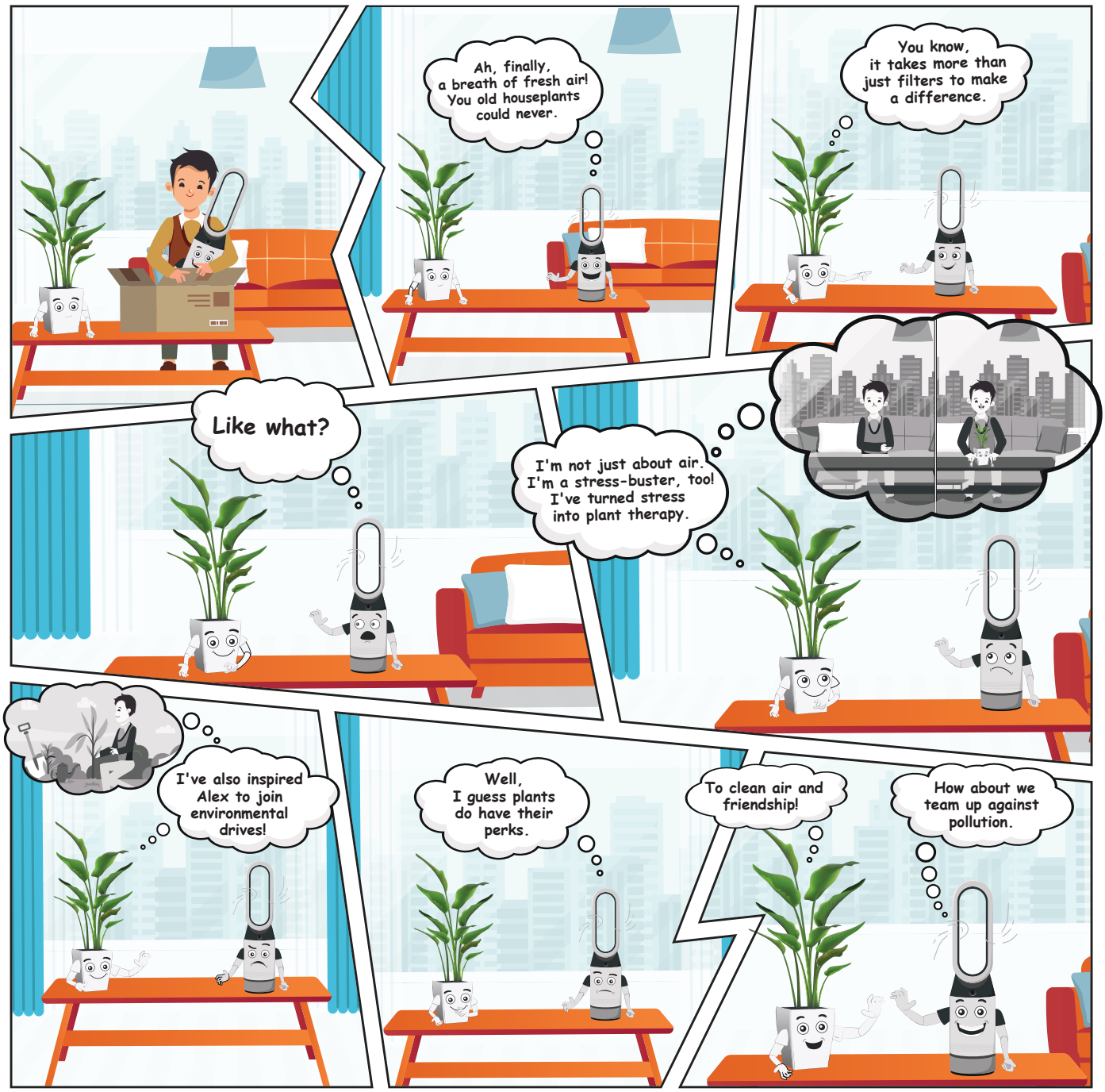
Since 1979, the Convention on Long-Range Trans boundary Air Pollution (CLRTAP) has been crucial in fighting air pollution through intergovernmental cooperation in the global north. It involves 51 countries from Europe, North America, and Japan, and its measures have prevented 600,000 premature deaths annually in Europe. Harmful emissions have significantly decreased in Europe (30-80%) and North America (30-40%) since 1990.

However, global exposure to toxic air pollutants still exceeds World Health Organization guidelines by 4 to 13 times. The need of the hour is to replicate CLRTAP's success through a brand new international agreement. Also, we need to ensure that the agreement takes into considerations the needs and capabilities of low and middle-income countries, following the principle of Vasudhaiv Kutumbakam.

As we face environmental challenges, the need for a global convention to eliminate air pollution is evident. It's a call for everyone to work together for a cleaner, healthier planet. With shared responsibility and collaborative efforts, an agreement can become a beacon of hope, guiding nations toward a future where clean air knows no borders - a future where we protect the breath we all share.

Comic Strip

Houseplants and Air Purifier – a tag team for a healthier and stress-free home!



Clearing the Air: Global Triumphs in Reducing Pollution

Reducing Air Pollution for a Healthier Tomorrow

Knee-jerk reactions to curb air pollution are not a permanent solution to the crisis, and we need lasting solutions. Sustainable solutions include strict laws, citizen participation and community engagement on a massive scale and dispersion of eco-friendly technologies. Various Countries have successfully implemented policies to reduce pollution levels drastically to a bearable amount. Let's explore some examples worth taking a look at.

Copenhagen's Cycling Revolution

In the bustling streets of Copenhagen, a cycling revolution has played a pivotal role in reducing air pollution. Faced with rising emissions from automobiles, this city in Denmark invested heavily in cycling infrastructure, creating an extensive network of bike lanes and icycle-sharing programs. As a result, a significant portion of the population shifted to eco-friendly commuting, leading to a substantial decrease in traffic-related air pollutants. Copenhagen's success highlights the transformative impact of sustainable transportation solutions on air quality.

Bogotá's Green Corridors

The city of Bogotá in Colombia, faced with challenges of rapid urbanization and traffic congestion, pioneered the concept of "green corridors." These corridors are dedicated lanes for public transportation, cycling, and pedestrians, lined with greenery to absorb pollutants. The city also invested in an expansive bus rapid transit (BRT) system, encouraging citizens to use public transport instead of private vehicles. Bogotá's green corridors not only reduced air pollution but also enhanced city's overall liability, proving that thoughtful urban planning can lead to a cleaner, healthier environment.

Singapore's Smart City Innovations

Singapore, a city known for its commitment to smart urban planning, tackled air pollution through technology and policy. The implementation of smart traffic management systems, stringent emission standards, and green building initiatives significantly lowered the city's carbon footprint. Singapore's success demonstrates the power of incorporating technology and forward-thinking policies to create a more sustainable and environmentally friendly urban landscape.

Bhutan: The First Carbon Negative Country in the World

Pune's Green Initiatives and Urban Forests

Pune embraced a holistic approach to combat air pollution by implementing a series of green initiatives. The city focused on increasing its green cover through extensive tree plantation drives and the creation of urban forests. Additionally, Pune incentivized the use of electric vehicles, installed pollution-absorbing vertical gardens, and enforced stricter emission norms for industries. City's commitment to environmental sustainability has resulted in a noticeable improvement in air quality, showcasing the positive outcomes of a comprehensive, nature-centric strategy.

Bhutan's Carbon-Neutral Villages

Bhutan, a small Himalayan kingdom, embarked on an ambitious mission to make its villages carbon-neutral. Through a combination of afforestation projects, reliance on renewable energy sources, and sustainable agricultural practices, Bhutanese communities significantly reduced their carbon footprint. The commitment to carbon neutrality at the local level has not only improved air quality but also contributed to Bhutan's broader national goal of remaining carbon-neutral as a country.

Community-Led Air Quality Monitoring in Mexico City

In the bustling metropolis of Mexico City, community groups took the initiative to monitor air quality independently. Armed with low-cost air quality sensors and supported by technology platforms, these local residents gathered real-time data on pollution levels. The information empowered communities to advocate for policy changes, hold industries accountable, and implement localized solutions to address specific pollution sources, resulting in tangible improvements in air quality.

These stories, from around the world to local neighbourhoods, illustrate various ways cities can tackle air pollution. They highlight that despite environmental challenges in cities globally, there is optimism. By employing clever strategies and collaborative efforts, we can enhance urban cleanliness, providing people with a higher quality of life. Cities, both in India and elsewhere, can draw lessons from these examples to create cleaner and healthier urban environments.

In the fight against air pollution, small communities around the world have demonstrated that significant change can happen at the local level. These highlight how grassroots initiatives, community engagement, and innovative solutions are making a substantial impact on improving air quality.

Can artificial rain fix the toxic air in India?

A plane is being prepared for Cloud seeding

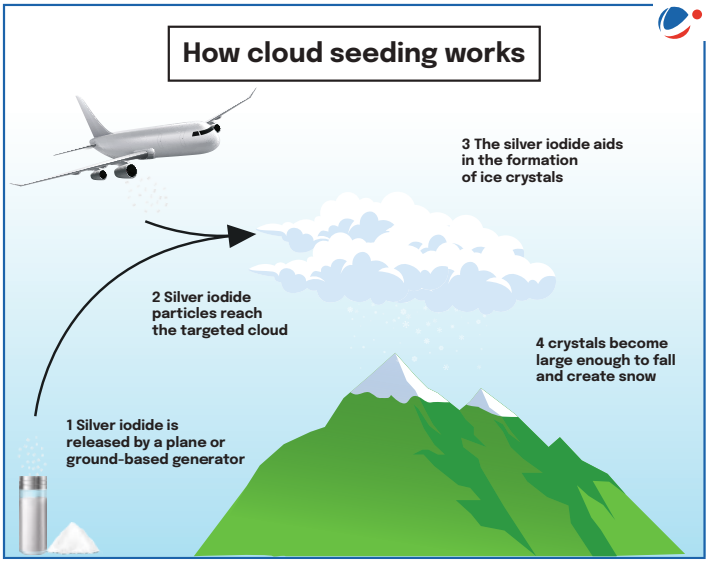
We actively participate in discussions about it, create songs dedicated to it, and frequently voice our complaints about it - "the rains." Now, have we reached a stage where we are capable of controlling rainfall? From a technical standpoint, it may seem too good to be true, but there are signs of change in the wind. Let's engage in a discussion about cloud seeding.

Unveiling the Secrets Behind Cloud Seeding

Cloud seeding is a technique that is used to increase rain by spreading substances into the air, thus encouraging the formation of rain or snow. So, let's understand how this works.

Normally, rain occurs in nature when small water droplets suspended in clouds increase in size until they become large enough to fall without evaporating. These droplets increase in size when they collide and merge with nearby droplets. This can happen in two ways: either by freezing onto solid particles with crystalline or ice-like structures, called ice nuclei or by adhering to tiny particles of dust or salt, known as condensation nuclei.

> Cloud seeding is a technique that is used to increase rain by spreading substances into the air



Process of Cloud Seeding

Cloud seeding boosts this natural process by injecting clouds with additional nuclei, thus enhancing the number of droplets that grow large enough to fall like raindrops or snowflakes, depending on air temperatures within and beneath the cloud.

These synthetic nuclei come in the form of chemicals like silver iodide (AgI), sodium chloride (NaCl), and dry ice (solid CO_2).

All these chemicals are released into the air either by ground-based generators or by aircraft carrying chemical-filled flares, and are then dispersed into precipitation-producing clouds.

Artificial Rain: A Solution for Pollution?

Artificial rain has been implemented for various reasons – to lessen the impact of droughts and hail damage, mitigate forest fires, increase precipitation, and improve air quality by dispersing pollutants.

> "Delhi government was planning to induce artificial rain through cloud seeding"

With air pollution reaching severe levels in many parts, Delhi government was planning to induce artificial rain through cloud seeding. But unseasonal rain in northern India before Diwali provided some respite from the pollution. Similarly, China has been using this method to clean its cities for many years.

The artificial rain washes away pollutants that are suspended in the atmosphere, the same way rainfall carries out the process of natural cleansing of the environment. It helps in dispersing air pollution and reducing the concentration of dust, smoke, smog, haze, and chemicals.

However, artificial rains cannot be considered as a guaranteed solution. For cloud seeding to be successful, suitable meteorological conditions are required. Cloud seeding requires the presence of moisture-filled clouds, which are not always available or predictable.

The use of potentially harmful chemicals can affect plants. There has been no substantial study done on the implications of silver iodine on the environment and the process of generating artificial rain is very expensive.

Another concern is that artificial rain has the potential to alter climatic patterns. Without effective regulation and control, this technique may lead to undesirable and even destructive weather conditions, such as flooding, storms, and increased hail risks. The weather system is so sensitive that if we want to tweak the flow of the monsoon here, it may cause desertification somewhere else.

An anti-smog gun that releases tiny water droplets into the air to absorb and settle the smallest dust and polluted particles.

Holistic approach: The answer to pollution woes

While artificial rain can provide temporary relief from pollutants in the air, the need of the hour is to control pollution the myriad sources of pollution.

It is crucial to recognize the interconnected nature of environmental issues and adopt a holistic perspective. Sustainable practices, conservation efforts, and the transition to renewable energy play pivotal roles in mitigating climate change and reducing pollution.

As we improve cloud seeding methods, it's important to find a balance between enjoying the benefits and dealing with the challenges. Research, clear communication and responsible use are key to making cloud seeding positively impact the environment and communities, while also avoiding any harmful effects.

Kodagu is home to the Kodava people, who have a unique culture and traditions.

Kodagu Model Village

Kodagu: Where Whispers Of The Wild Echo Conservation's Song

In the heart of the lush Western Ghats, nestled within the enchanting landscapes of Karnataka, lies a testament to human ingenuity and environmental stewardship – the Kodagu Model Village initiated in 2000 by a group of local stakeholders. This quaint village stands as a shining example of a community-driven conservation effort that harmoniously blends tradition with innovation. Here's a deeper dive into the village's remarkable conservation efforts.

The Story begins with a growing human impact on the area's natural resources, causing problems like the degradation of community lands (like Sacred Groves), more conflicts between humans and animals, and a decline in the number and variety of trees in agroforests. So, local stakeholders started the Model Forest to run effective programs for conserving and protecting the fragile ecosystem of the forest landscape.

Community-based Conservation in Kodagu involves empowering local communities by blending their traditional knowledge and practices into conservation strategies. This approach creates a feeling of ownership and responsibility, promoting long-term sustainability. Apart from this ecotourism is used as it brings in money for conservation and educates visitors about protecting the ecosystem. Staying in homes and going on nature walks offer immersive experiences that make a lasting impact.

Moreover, wildlife corridors in Kodagu provide safe paths for animals. These protected routes enable elephants, tigers, and other species to move freely, ensuring they can find necessary resources. In the context of agriculture, they promoted sustainable agriculture. Boosting sustainable agriculture involves organic farming practices that are gentle on the environment and promote soil health, creating a thriving ecosystem. Agroforestry systems contribute by enriching biodiversity and providing habitats for wildlife.

Last but not least, programs in schools and communities teach about the environment, instilling a strong respect for nature in future generations, ensuring a lasting commitment to conservation, created long- lasting awareness.

The Kodagu Model Village, born from the collective spirit of a community, had not only benefited conservation efforts but had become a testament to the transformative power of harmonious coexistence. In the heart of Harmony Haven, where the pulse of nature synchronized with the rhythm of daily life, the villagers whispered their gratitude to the winds that carried their story-a story that echoed across the hills, inspiring generations to come.

National Clean Air Programme (NCAP)

Air pollution, which is one of the biggest environmental challenges, has also become a significant health concern for India. It also impacts places away from the source. To tackle it, the Ministry of Environment, Forest and Climate Change launched the National Clean Air Programme (NCAP) in 2019. It is a long-term, time-bound, national - level strategy to tackle the air pollution problem across the country in a comprehensive manner.

The programme envisages to achieve reductions up to 40% or achievement of National Ambient Air Quality Standards for Particulate Matter10 (PM 10) concentrations by 2025-26. For this, sectoral policies, strengthening monitoring and enhancing public participation in more than 100 cities has been emphasized.

The Central Pollution Control Board (CPCB), in consonance with the Air (Prevention and Control of Pollution) Act, 1981, executes the nationwide programme. Under it, City Action Plans (CAPs) have been prepared. They are implemented by the coordinated action of state government and its agencies at state and city levels.

PRANA (Portal for Regulation of Air-pollution in Non-Attainment Cities) has been also launched. It is a portal for monitoring of the implementation of NCAP. It will support tracking of the physical as well as financial status of city air action plan implementation and disseminate information on air quality management efforts under NCAP to the public.

Save The Birds Campaign

During the month of the scorching summer season, thousands of birds die due to a lack of drinking water and grains to eat. In order to help distressed birds, Dainik Bhaskar Group launched 'Save The Birds'. It is funded by the company's Corporate Social Responsibility (CSR) fund.

The Company encouraged its readers to place Sakroras (earthen birdbaths) filled with water and grains on roof or window, to help these birds survive. The Company has also partnered with the World Wide Fund for Nature (WWF) India and Nature Forever Society for this campaign to improve sustainability of Campaign.

It covered state/UTs like Madhya Pradesh, Chhattisgarh, Gujarat, Jharkhand, Chandigarh, Haryana, Punjab, Himachal Pradesh, Maharashtra, Rajasthan and Delhi NCR. It helped mobilise millions of people and sensitized them. Also, millions of earthen vessels were distributed.

Briefings

India

Sea turned red in Puducherry

Visitors at the northern side of the Promenade Beach in Puducherry have witnessed a strange phenomenon: the water has turned reddish tinge. According to the National Centre for Coastal Research

Red tide at Promenade Beach in Puducherry

(NCCR), a change in colour is attributed to the harmful algal bloom (HAB). It is also referred as Red Tide.

The algal bloom occurred due to anthropogenic influences, including sewage mixing into the sea, besides the reversal of ocean currents and an increased concentration of nutrients in the coastal waters as per the member of the Puducherry Pollution Control Committee (PPCC).

It is not the first time that algal bloom has been witnessed at the Indian Coast. Earlier, green, blue-green etc. algal blooms have been noticed. Algal bloom is harmful for marine animals and it depletes levels of oxygen in the water, which can kill fish and other living creatures. As the Harmful algal bloom occurs near the water surface, it can also block sunlight from reaching organisms deeper in the water.

Trapped workers rescued with the help of Rat Hole mining

The 41 workers trapped in the collapsed Silkyara-Barkot tunnel in Uttarakhand were safely rescued with the help of Rat Hole mining. During the last phase of the evacuation, when machines were not able to drill the rocks, so the rat miners were called for help. They crawled through an 80-centimeter (2.6 feet) diameter pipe inserted into the debris, crouched for hours in the small space and dug through the final 12 meters (about 40 feet) of rubble with their bare hands.

Trapped workers being rescued in Silkyara-Barkot tunnel

So, what is Rat hole mining? It is a method of extracting coal from narrow, horizontal seams, prevalent in Meghalaya. The term “rat hole” is named so as it refers to the narrow pits dug into the ground, typically just large enough for one person to descend and extract coal.

Once the pits are dug, miners descend using ropes or bamboo ladders to reach the coal seams. The coal is manually extracted using primitive tools such as pickaxes, shovels, and baskets. It poses significant safety and environmental hazards. Therefore, the National Green Tribunal (NGT) banned the practice in 2014.

India’s maiden winter scientific Arctic expedition

The Union Minister, of the Ministry of Earth Sciences (MoES), Shri Kiren Rijiju, flagged off India’s first winter scientific expedition to the Arctic. Scientific expeditions to the Arctic are facilitated under the Ministry’s PACER (Polar and Cryosphere) scheme.

The expedition will allow researchers to conduct unique scientific observations during polar nights, where there is no sunlight for nearly 24 hours and sub-zero temperatures (as low as -15°C). This will aid in expanding understanding of the Arctic, especially in terms of climate change, space weather, sea-ice and ocean circulation dynamics and ecosystem adaptations. These patterns affect weather and climate in the tropics, including monsoons.

Expedition comprises researchers from the host National Centre for Polar and

Ocean Research (NCPOR), Indian Institute of Technology (IIT) Mandi; Indian Institute of Tropical Meteorology (IITM), Pune; and Raman Research Institute, Bengaluru. They will stay at Himadri, India's research base in the Arctic since 2008.

Arctic is an area of scientific, climatic, and strategic importance; hence, scientists will have to play a vital role in the addressing areas that affect life and survival on this planet.

Gujarat declares Ghol as the state fish

During the Global Fisheries Conference India 2023 in Ahmedabad, Chief Minister Bhupendra Patel declared the Ghol fish (Black spotted croaker) as Gujarat's state fish. It has been declared because of its economic value and its uniqueness. The declaration will enable Gujarat to be a part of its conservation efforts.

Fish is distinguished by its substantial size and striking golden-brown hue. It is usually found in the Indo-Pacific region that stretches from the Persian Gulf to the Pacific Ocean.

Ghol fish

It is highly esteemed in the international market due to its medicinal and nutritional attributes. It is packed with a wealth of nutrients such as iodine, omega-3, DHA, EPA, iron, taurine, magnesium, fluoride, and selenium. As per industry specialists, the air bladder of the fish is estimated to be worth over Rs 1 lakh per kilogram.

Gujarat is not the first state to declare state fish. States like Maharashtra and Uttar Pradesh have also declared their state fishes respectively.

Namdapha flying squirrel resurfaces after 42 years

The Namdapha Flying Squirrel (Biswamoyopterus biswasi) has resurfaced in Arunachal Pradesh. It was last seen in 1981. This nocturnal flying squirrel is Indigenous to the Changlang district and endemic to the Namdapha National Park. It is discovered in the Mesua Ferrea jungles bordering the Noa Dihing River.

Namdapha flying squirrel

It has reddish-grizzled fur with white markings. Its crown displays a pale grey hue, while its patagium (a membrane or fold of skin between the forelimbs and hindlimbs) exhibits an orangish colour, and its underparts are white.

It is often confused with the Red Giant Flying Squirrel, another species in the region. Distinguishing between the two presents a considerable challenge due to their similar appearances as per the researcher.

It is among the '25 most wanted lost species' identified by the Global Wildlife Conservation's Search for Lost Species initiative. Additionally, it is protected under Schedule II of the Wildlife Protection Act 1972 and is classified as critically endangered on the International Union for Conservation of Nature (IUCN) Red List.

Global

Champions of the Earth 2023 Announced

The United Nations Environment Programme (UNEP) announced the 'Champions of the Earth 2023'. The awards celebrate inspirational and motivational examples of the potential of individual and collective action to change the world.

Winners of the Champions of the Earth 2023

Winners include Josefina Belmonte, Mayor of Quezon City in the Philippines (Policy Leadership), the UK-based Ellen MacArthur Foundation (Inspiration and Action), China's Blue Circle (Entrepreneurial Vision), José Manuel Moller of Chile (Entrepreneurial Vision) and Council for Scientific and Industrial Research (Science and Innovation). They were declared winners "for their innovative solutions and transformative action to tackle plastic pollution".

In collaboration with UNEP, the Ellen MacArthur Foundation leads the New Plastics Economy Global Commitment. It unites more than 1,000 organizations – including consumer goods giants such as H&M, PepsiCo and the Coca-Cola Company – and governments representing 1 billion people behind a common vision to stop plastic from becoming waste.

''Blue Circle environmental initiative has paid fishers and residents in coastal communities– to collect plastic debris, such as bags, bottles and discarded fishing nets'' according to UNEP.

COP-5 of the Minamata Convention on Mercury Organised

The fifth meeting of the Conference of the Parties to the Minamata Convention (COP-5) was held in Geneva, Switzerland. More than 800 participants and 900 online viewers participated in it.

It made significant progress by adopting 23 decisions to protect human health and the environment from the harmful effects of mercury.

The COP noted the importance of broadening the participation of Indigenous Peoples, as well as local communities, in the implementation of projects and programmes undertaken under the Convention. It recalled the relevance of their engagement in the work to reduce and eliminate mercury use in artisanal and small-scale gold mining (ASGM).

Proceedings at COP-5 of the Minamata Convention

The COP established a group to oversee the development of the first report to evaluate the effectiveness of the Convention, following the agreed indicators, most of them based on national reporting submissions.

COP encouraged Parties to take several steps to advance integrated action on mercury reduction and biodiversity. Also, it invited the Conference of the Parties to the Convention on Biological Diversity to consider additional indicators to cover highly hazardous chemicals and mercury.

Kunming-Montreal Global Biodiversity Framework (GBF) celebrates 1st anniversary

The Kunming-Montreal Global Biodiversity Framework (GBF) was adopted during the fifteenth meeting of the Conference of the Parties (COP 15) of the UN Convention on Biological Diversity in 2022.

COP 15 of UN Convention on Biological Diversity (2022)

This historic Framework supports the achievement of the Sustainable Development Goals and builds on the Convention's previous Strategic Plans. And it sets out an ambitious pathway to reach the global vision of a world living in harmony with nature by 2050. Among the Framework's key elements are four goals for 2050 and 23 targets for 2030.

Its implementation is guided and supported through a comprehensive package of decisions adopted at COP 15. This package includes a monitoring framework for the GBF, an enhanced mechanism for planning, monitoring, reporting and reviewing implementation, etc. GBF Fund has also been established to support its implementation.

All Parties committed to setting national targets to implement it, while all other actors have been invited to develop and communicate their own commitments.

Climate crisis compounds woes for Somalia

Somalia and neighbouring countries in East Africa have been hit by floods after the prolonged drought. The United Nations has described floods as a once-in-a-century event.

Around 1.6 million people in Somalia were affected by the heavy seasonal downpours. Also, large numbers of people have died.

Heavy rainfall is witnessed due to the combined impact of two climate phenomenon, i.e. El Niño and the Indian Ocean Dipole.

Climate change resulted in floods in Somalia

Camps for people displaced by an insurgency and the worst drought in four decades have also been flooded, causing people to flee for a second time, according to the UN Office for the Coordination of Humanitarian Affairs (OCHA).

"Extreme weather linked to the ongoing El Niño risks further driving up humanitarian needs in already-vulnerable communities in Somalia and many other places," said Martin Griffiths, Under-Secretary-General, the UN's Humanitarian Affairs and Emergency Relief Coordinator.

Scientists developed an electrically conductive Soil

Researchers from Linköping University in Sweden have developed an electrically conductive "soil" (e-soil) for soilless cultivation, known as hydroponics. They demonstrated that barley seedlings grown in the e-soil grew up to 50% more in 15 days when their roots were stimulated electrically.

Hydroponic farm

According to the researcher "the world population is increasing, and we also have climate change. So it's clear that we won't be able to cover the food demands of the planet with only the already existing agricultural methods. But with hydroponics we can grow food in urban environments in very controlled settings''.

Hydroponics harnesses a sophisticated root system activated through a novel cultivation substrate. In it, plants thrive without soil, reliant solely on water, nutrients, and a supportive substrate for root attachment. This enclosed system facilitates water recycling, ensuring precise nutrient delivery to each seedling. Consequently, minimal water usage and optimal nutrient retention distinguish hydroponics from conventional methods.

Unleashing Nature's Fury: Understanding Glacial Lake Outburst Floods (GLOFs)

Glacial lakes, dammed by rocks and/or ice jams, can burst suddenly and cause catastrophic damage in nearby communities

In 2023, Sikkim experienced the Teesta floods linked to Glacial Lake Outburst Floods (GLOFs), highlighting the need for positive environmental initiatives and community resilience. The Himalayan region had already been facing challenges like the Joshimath disaster and the Himachal flood. The GLOFs representing a powerful force of nature that can wreak havoc in mountainous regions, has emerged as a significant threat to both the environment and human settlements.

GLOFs occur when the natural dams holding back glacial lakes fail releasing massive volumes of water downstream. In Sikkim's case, this dam failure occurred in parts of Lhonak Lake. In this article, we delve into the intricate dynamics of GLOFs, exploring their causes, consequences, and broader implications for mountain ecosystems.

> GLOFs occur when the natural dams holding back glacial lakes fail releasing massive volumes of water downstream

Understanding the Causes

GLOFs are primarily triggered by the weakening or collapse of moraine dams, formed by the accumulation of rocks, debris, and sediment at the edges of Glacial lake. This can happen due to various reasons, such as excessive water accumulation in the lake or triggers like earthquakes. Climate change plays a pivotal role in this process, as rising temperatures contribute to the accelerated melting of glaciers. The increased meltwater enters these glacial lakes, intensifying

Glacial lake outburst flood in Sikkim kills many

pressure on the moraine dams. When the dam's structural integrity is compromised, a devastating flood is unleashed downstream.

As global temperatures continue to rise, the frequency and intensity of GLOFs are expected to increase. Mountainous areas, already at risk from climate change, are facing increased dangers from faster glacial melting. The world's glaciers have been melting almost twice as fast over the last two decades, making Glacial Lake Outburst Floods a significant and urgent concern.

> "Looking at specific examples that show the severe impact of Glacial Lake Outburst Floods (GLOFs), we can see an escalating danger in the Himalayas"

Consequences for Mountainous Regions

GLOFs have widespread effects that go beyond the flood itself. The immediate result is the powerful floodwaters causing severe destruction - whole villages, infrastructure, and farmland can be wiped out. This often leads to a significant number of people being displaced and results in loss of life and property. The aftermath often involves a prolonged recovery process, with communities grappling with the loss of lives and livelihoods.

Moreover, GLOFs can have lasting environmental consequences. The sudden release of water carries debris, rocks, and sediment downstream, altering river courses and affecting the delicate balance of ecosystems. Sediment deposition can lead to the formation of new lakes or exacerbate existing ones, perpetuating the cycle of GLOFs in the region.

Looking at specific examples that show the severe impact of GLOFs, we can see an escalating danger in the Himalayas. In June 2013, Uttarakhand experienced heavy rainfall, causing the Chorabari glacier to melt and leading to the eruption of the Mandakini River. This resulted in widespread flooding, especially impacting the Kedarnath valley. Tragically, over 5,000 lives were lost in the aftermath of the floods. In August 2014, the Gya village of Ladakh witnessed a GLOF. The glacial stream of the village started to gush, and the water destroyed the farmlands, crops and a couple of houses.

What should we do?

Efforts to mitigate the risks associated with GLOFs involve a combination of early warning systems, improved infrastructure, and sustainable land-use planning. Identifying and monitoring glacial lakes, reinforcing moraine dams, and implementing community-based adaptation strategies are crucial components of a comprehensive approach.

Lastly, unleashing nature's fury, GLOFs underscores the intricate interplay between climate change, glacial dynamics, and the vulnerabilities of mountainous regions. Understanding these phenomena is paramount for developing effective strategies to mitigate risks and protect communities.

As we confront the challenges posed by GLOFs, a concerted global effort is required to address the root causes and adapt to the changing realities of our warming planet.

Snapshot

Air Pollution Killing Bees?

In a world where even bees need to check the air quality forecast before buzzing off to work, our fuzzy friends find themselves in a sticky situation. Air pollution has become the ultimate buzz-kill for these hardworking pollinators.

Bees

Bees have been here about 30 million years! Social bees, such as honeybees and bumblebees, often live in hives or nests with members of the hive divided into 3 types:

Queen: Runs the whole hive with primary job to lay the eggs that will spawn the hive's next generation of bees.

Workers: A female with the role to-

- Forage for food (pollen and nectar from flowers)
- Build and protect the hive
- Clean and circulate air by beating their wings.

Drones: Male bees with purpose to mate with the new queen.

The Queen Bee

The queen bee is exclusively responsible for the temperament of the colony which, she controls with her pheromone (scent).

A queen bee can produce over 3,000 eggs in a single day at the peak of her laying, more than her own body weight in eggs.

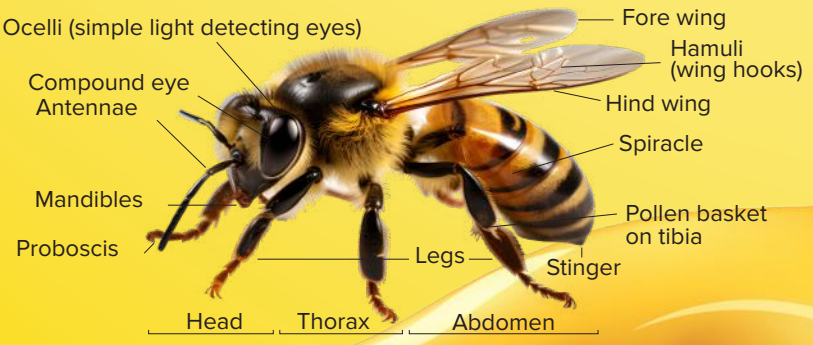
Her average lifespan is between 2 to 7 years.

If the queen bee dies, workers create a new queen by selecting a young larva and feeding it a special food called "royal jelly".

losing its stinger will cause them to die

They do dance move called the 'waggle dance', for communicating where to go to find the best source of food.

Scientists have managed to train buff-tailed bumblebee, with brain the size of a poppy seed, to score a goal in 'bee football' in return for a sugary treat.



How Bees keep the human existence buzzing?

Pollinates a third of our food.

Makers of that sweet, sticky substance called ‘honey’: The average forager makes about 1/12 th of a teaspoon of honey in her lifetime

Help fight cancer: Venom from some honeybees and bumblebees has found to be surprisingly effective at destroying certain types of cancer cell.

Might have skills to predict storms according to some studies.

Sadly, over the past few decades, colonies of bees have been disappearing, and the reason remains unknown.

Healthy Hive:

- Balanced population with strict division of labor
- Plenty of food stores of wax and honey

Unhealthy Hive:

- No adult bees (dead or alive) but larval brood present
- Decreased foraging efficiency and survival

Colony Collapse Disorder (CCD)

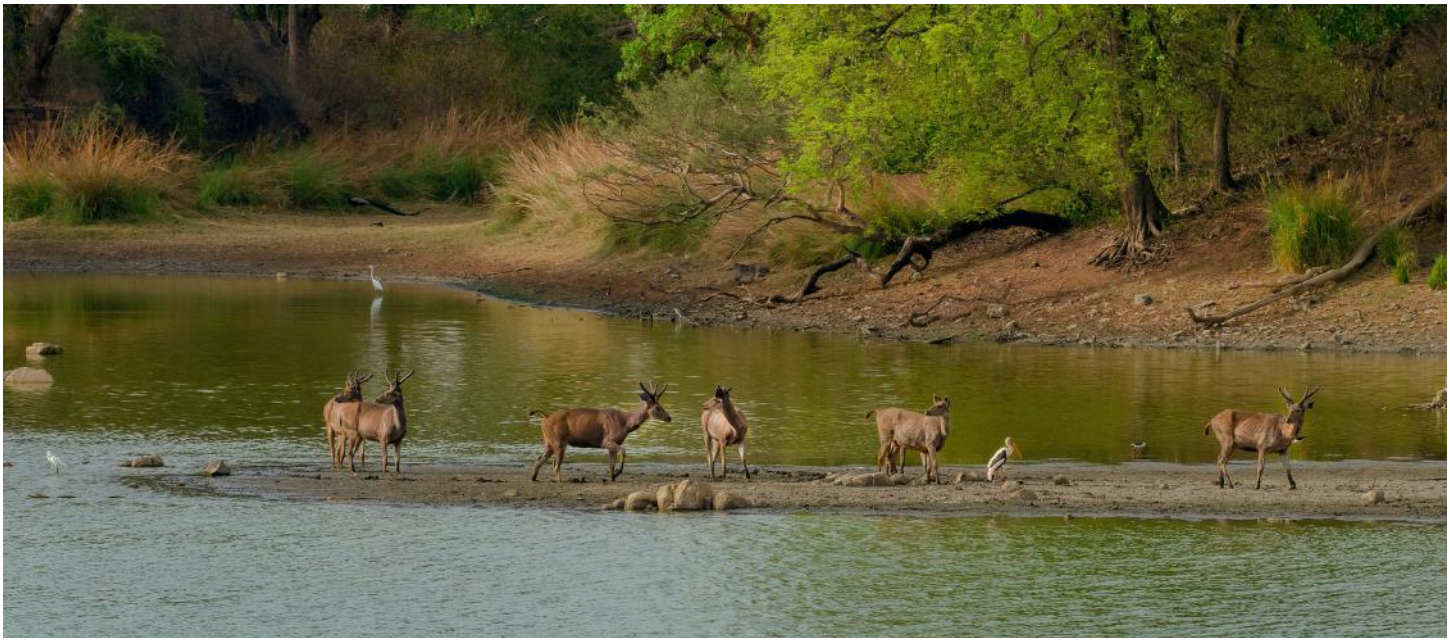
2-4 weeks

Possible Causes: Pesticides, Pathogens Nutritional stress?

How you can help?

- Plant a range of flowers in your garden so bees have access to nectar.
- If you think the bee is struggling, gently put the bee onto a bee-friendly flower.
- If there are no bee-friendly flowers around, mix 50/50 white sugar and water to give the bumblebee a one-off energy boost.

World Heritage Sites: The Road to Preservation



The designation as a UNESCO World Heritage Site aims to raise awareness about the importance of protecting and preserving these areas

In 1960, a dam nearly drowned the ancient Abu Simbel temples in Egypt. These are two old temples made by Ramses II over 3,200 years ago. People from all around the world teamed up to save them. They took the temples apart and put them back together on higher ground. This rescue mission got everyone thinking: there are special places that are super important for everyone, and we need to keep them safe from things like floods, wars, and climate change. That's when the idea of world heritage sites came to life.

Timeless Treasures: Decoding the World Heritage Sites

The United Nations Educational, Scientific and Cultural Organization (UNESCO)- World Heritage Site List comprises natural and cultural sites that are considered to be of outstanding value to humanity. These sites are selected based on their cultural significance, natural beauty, and historical importance. The list includes some of the most iconic landmarks in the world, such as the Great Wall of China, the Taj Mahal, the Pyramids of Egypt, the Grand Canyon, and the Great Barrier Reef.

The preservation of these sites is essential for several reasons. Firstly, they are a testament to our history and culture. They tell the story of the past and help us understand our roots, traditions, and beliefs. Secondly, these sites are a valuable educational resource. Thirdly, preserving these sites is crucial for the environment.

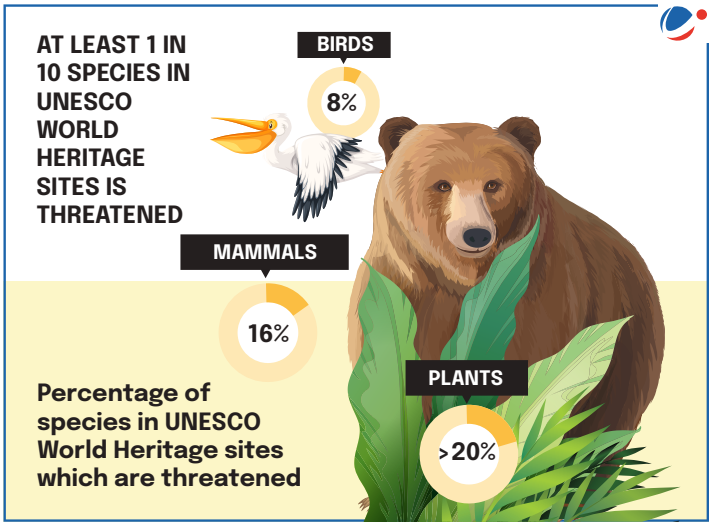
Heritage Sites in the Epic Battle for Preservation

UNESCO World Heritage sites – ranging from the Great Barrier Reef in Australia to the Great Wall of China - contain more than 75,000 species of plants and trees and over 30,000 species of mammals, birds, fishes, reptiles, and amphibians. The World Heritage Sites make up less than 1 % of the Earth's surface but harbor more than 20 % of the planet's biodiversity.

They are estimated to protect over 20,000 endangered species, including up to a third of all elephants, tigers, and pandas, and at least one-tenth of great apes, lions, and rhinos.

Endangered African Savanna Elephants in Tsavo National Park (UNESCO World Heritage Site of Kenya)

Many highly vulnerable animals, such as Javan Rhinos, Pink Iguanas, Sumatran Orangutans, and Mountain



Gorillas, are "the last line of defence against extinction" and are present only at world heritage sites. The World Heritage Convention of 1972 confers the highest level of international protection to these locations, found across 167 countries.

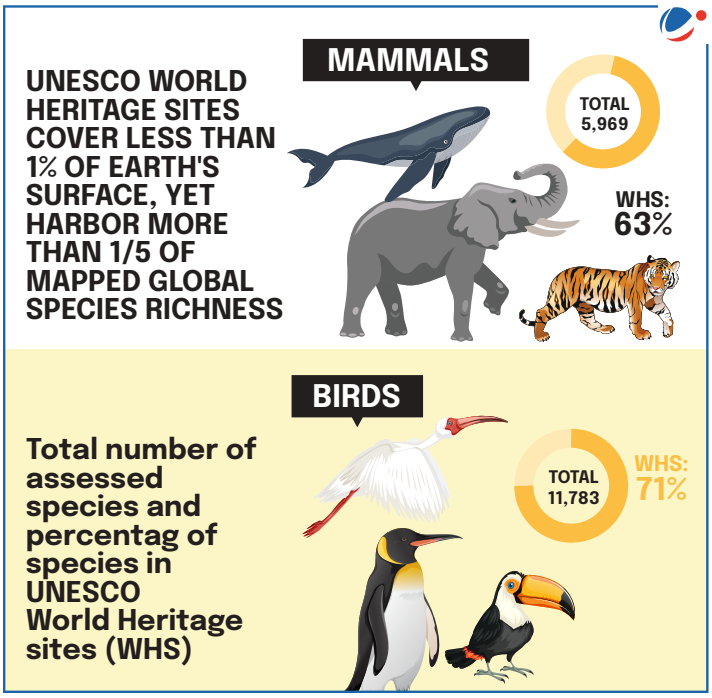
Once a country signs the World Heritage Convention and has sites inscribed on the World Heritage List, the resulting prestige often helps raise awareness among citizens and governments for heritage preservation. Greater awareness leads to a general rise in the level of protection and conservation given to heritage properties. A country may also receive financial assistance and expert advice from the World Heritage Committee to support activities for the preservation of its sites. However, these protected havens are not free from snags and dangers.

What threatens the World Heritage Sites?

The 1972 treaty has enabled successful conservation initiatives, such as those undertaken in the Kaziranga National Park in India and Chitwan National Park in Nepal, where the number of Greater one-horned Rhinos has doubled to some 4,000 since the mid-1980s.

However, UNESCO stressed the urgent need to strengthen conservation measures, warning that "the clock is ticking for immediate action." Every 1°C increase in global temperature could double the number of endangered species threatened by dangerous climate conditions.

The World Heritage Fund plays a crucial role in preserving special places around the globe, but it grapples with challenges due to late or insufficient contributions from some nations. This financial strain limits its ability to meet the needs of all countries effectively. Compounding this issue, heritage sites endure the double blow of increasing natural disasters and the impact of armed conflicts.



Adding to the complexity, developmental activities such as constructing reservoirs, which sometimes lead to the flooding of vital areas within these heritage properties, pose a threat. Industrial and agricultural development, along with human encroachment, also jeopardize the integrity of these sites.

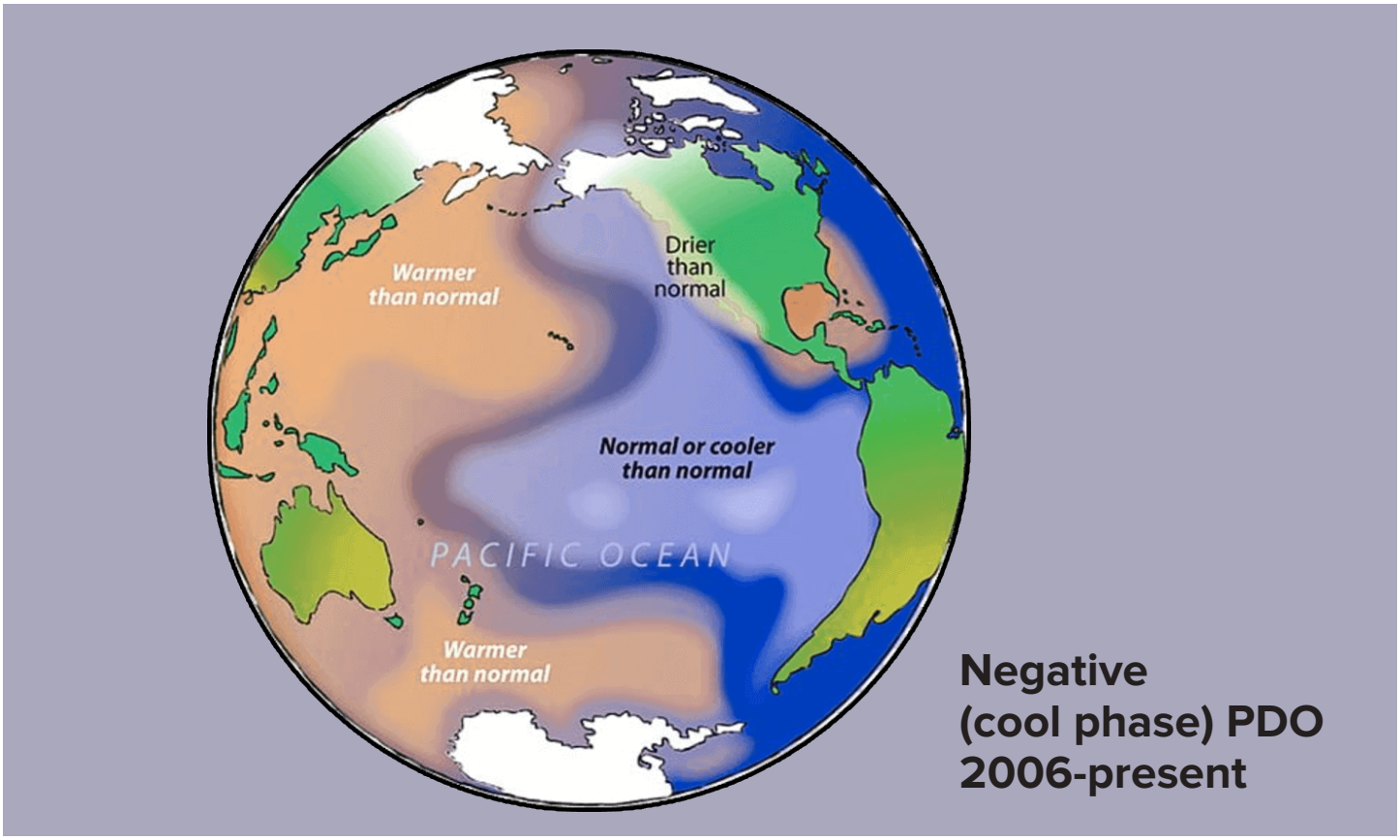
Future outlook to protect the World Heritage Sites

Recognizing the crucial role of UNESCO World Heritage sites as essential hubs for biodiversity, the agency emphasized the need for States Parties of the Convention to spare no effort in safeguarding these precious areas. UNESCO urged countries to prioritise to World Heritage sites in their national plans for protecting biodiversity, aligning with the worldwide agreement reached last year known as the Kunming-Montreal Global Biodiversity Framework.

The framework sets ambitious targets, such as stopping and reversing the loss of nature, and one of its goals is to protect 30 percent of the Earth's lands, coastal regions, and inland waters by the end of the decade. The message is clear: these extraordinary sites deserve our utmost protection, and it's a global responsibility, including us, to ensure their preservation for the well-being of our planet.

Conserving and protecting world heritage sites is paramount to safeguarding the rich tapestry of human history, culture, and natural wonders. It is an ethical responsibility that transcends national boundaries, calling for collaborative efforts to ensure the preservation of these irreplaceable treasures

Pacific Decadal Oscillation: Nature's Pulse in the Pacific Realm



Surface sea temperature patterns of the Pacific Ocean during different phases of the Paacific Decadal Oscillation

In recent decades, tropical cyclones originating near the Equator, though typically destructive, have exhibited an unusual level of restraint. The most recent significant cyclone of this nature in the Indian region was the Cyclone Okchi in 2017, which wreaked havoc in the states of Kerala and Tamil Nadu in India and the neighboring Sri Lanka. However, a study published in the journal Nature Communications suggests that a combination of global warming and the recurrent Pacific Decadal Oscillation (PDO), cycling every 20-30 years, may increase the frequency of such cyclones in the upcoming years.

> Global warming and the recurrent Pacific Decadal Oscillation (PDO), cycling every 20-30 years, may increase the frequency of such cyclones in the upcoming years

Understanding the Pacific Decadal Oscillation

The PDO is a long-term climate pattern characterized by fluctuations in sea surface temperatures (SSTs) and atmospheric pressure over the North Pacific Ocean. These fluctuations occur on a multi-decadal timescale, typically spanning two to three decades, and have profound implications for weather patterns across large parts of Asia and North America.

Phases of the PDO

Understanding the PDO necessitates a closer look at its two primary phases: the positive and negative. The 'cool' or 'negative' phase is characterized by a cool wedge of lower than normal sea-surface heights/ocean temperatures in the eastern equatorial Pacific and a warm horseshoe pattern of higher than normal sea-surface heights connecting the north, west and southern Pacific.

In the 'warm' or 'positive' phase, the west Pacific Ocean becomes cool, and the wedge in the east warms. A 'cool' phase occurred from 1947 to 1976 (29 years), and a 'warm' phase from 1977 to 1999 (22 years). However, more recently, the 'warm' and 'cold' phases have been much shorter. The PDO's phases are not only pivotal for

comprehending regional climate patterns but also play a role in shaping global climate phenomena. While the PDO doesn't cause specific events like a single storm, but it can influence weather patterns over several years.

Impact of PDO on weather patterns

During the positive phase of the PDO in the northern hemisphere wintertime, much of Asia is usually cooler than normal, with above normal temperatures more likely over India. At the same time, China and Japan are likely to be drier than normal, while India often has a winter that is wetter than normal. Further, the Southern and Eastern US is more likely to experience above normal temperatures, with below temperatures more likely in the West and Northwest.

> PDO has also been correlated with Marine Heat Waves (MHWs) in the northeast Pacific on decadal timescale

During the negative phase of the PDO in wintertime, much of India and China is usually cooler than normal, but Japan has warmer than normal weather, especially in the North. However, many parts of the US see drier than normal weather, with some exceptions in Tennessee Valleys, Northern Rockies, etc.

Marine Ecosystems in threat?

PDO profoundly influences marine ecosystems and ocean environmental conditions. Changes in SSTs disrupt the distribution of marine species, and primary production of phytoplankton, among others. For instance, during the negative phase of PDO, SST is warmer and mixed layer depth is shallower in the Japan Sea. The higher surface temperature and shallower mixed layer depth lead to weakening of vertical mixing. This may reduce nutrient supply to the euphotic layer, providing small-sized phytoplankton favoured environmental conditions.

Further, studies also suggest the bioaccumulation of persistent organic pollutants in the marine food web due to changes in SST due to PDO. This results in altered health and biochemistry of organisms, particularly at lower trophic levels. Change in SST has also been associated with the ability of penguins, a high trophic-level organism, to capture prey.

PDO has also been correlated with Marine Heat Waves (MHWs) in the northeast Pacific on decadal timescale. Researchers found that MHWs off the coast of the Northeast Pacific have become longer, more intense and more frequent under a positive PDO scenario relative to what is seen during a negative PDO scenario.

Why PDO could enhance the frequency of cyclones in coming years?

The positive phase of PDO provides unfavorable conditions for low latitude cyclones (LLCs) due to southward displacement in equatorial westerly winds and a slightly increased vertical wind shear.

However, global warming provided favorable local thermodynamic conditions to make them slightly more frequent.

However, in 2019, PDO entered a cooler or negative phase which provided favourable conditions for LLCs in the north Indian Ocean. Therefore, the natural (PDO) and anthropogenic forces (global warming) begin to work synergistically to amplify the frequency of severe cyclones in the post-monsoon north Indian Ocean. These results may guide planning and mitigating LLC-induced disasters in the Indian subcontinent.

PDO Variability and Climate Change

As the world grapples with the consequences of anthropogenic climate change, understanding natural climate variability like the PDO becomes increasingly critical. Scientists are working to discern the complex interplay between natural climate patterns and human-induced warming to better predict future climate scenarios. The PDO, with its cyclical nature, adds an additional layer of complexity to climate modeling, requiring a comprehensive understanding to unravel its interactions with contemporary climate change.

The Pacific Decadal Oscillation stands as a testament to the intricate dance of nature, orchestrating climate patterns across the vast expanse of the Pacific. Its far-reaching effects on weather, marine ecosystems, and global climate systems underscore the need for ongoing research to decipher its complexities. As we strive to navigate an era of climate change, unlocking the secrets of the PDO holds the key to anticipating and adapting to the dynamic and ever-changing face of our planet's climate.

Scientists are still figuring out how the Pacific Decadal Oscillation and climate change are connected. It's like solving a puzzle because Earth's climate is complex, and many factors are at play.

Green Buildings: The Building of Tomorrow

Green Buildings incorporate environmentally friendly measures and prioritize resource efficiency throughout their entire lifecycle

Shyam, residing with his parents in a bustling Mumbai building, embarked on a summer vacation adventure to his ancestral village in the Beed district. To his surprise, despite the soaring temperatures compared to the urban hub of Mumbai, the locals seemed to have mastered the art of staying cool without relying on electric appliances. The buildings exuded a natural coolness that piqued Shyam's curiosity and captivated him with this age-old yet modern concept prevalent in India-Green Building construction.

Green Building: Architecture for environment

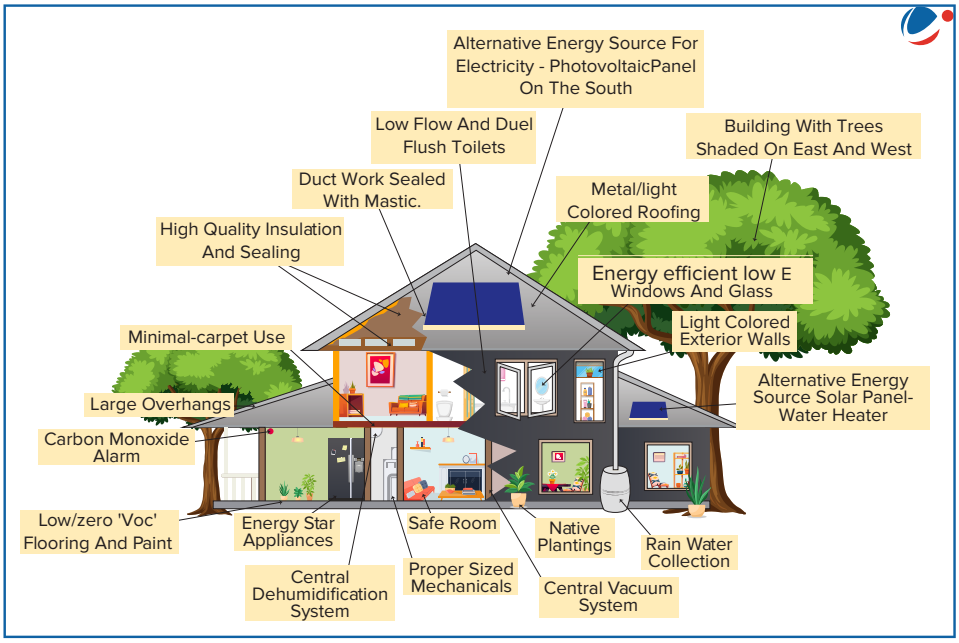
Green buildings incorporate environmentally friendly measures and prioritize resource efficiency throughout their entire lifecycle. The concept of green buildings is aimed at not only minimizing the negative impact but also maximizing the positive influence a building has on both its natural surroundings and the well-being of its occupants.

> Green building principles often focus on optimizing indoor air quality, incorporating natural light, and creating spaces that promote occupant health and productivity

Adopting a holistic approach throughout the planning, design, construction, operation, and maintenance phases, green buildings effectively harness the inherent efficiencies of a building site. They seamlessly integrate these natural advantages with renewable and low-carbon technologies, ensuring the building meets its energy needs while fostering a healthy built environment. But what exactly makes a building green?

Key priorities in green buildings encompass the efficient utilization of energy, water, and other resources. This involves a thoughtful and strategic approach to resource management, ensuring that every element is utilized optimally. Innovative solutions are also employed in green construction, which may include Cool Roofs, Geothermal Heating, Smart Grid refrigerators, vegetated rooftops, etc. For example, Agrocrete is a carbon-negative building material made of crop residues such as paddy straw, wheat straw, sugarcane bagasse, etc. These types of design come with a legion of benefits.

Green buildings outshine traditional counterparts by consuming a remarkable 25% less energy, paving the way for substantial environmental benefits. Not only do these eco-friendly structures boast reduced energy consumption, but they also boast lower operational and maintenance costs. What's more, they contribute to improved occupant productivity and



Green Building Concept: an example of residential structure

optimize the overall economic performance throughout their life cycle.

One of the standout features of green buildings is their ability to enhance occupant comfort and health. By ensuring access to clean air and water and minimizing exposure to toxins and volatile organic compounds, these buildings create environments where well-being takes center stage. However, constructing and maintaining these green marvels is not an easy task.

Exploring the Constraints of Green Construction

The most prevalent constraint for green buildings is their cost. While green buildings can provide significant long-term financial benefits, their initial costs are higher than conventional buildings. The materials and technologies they utilize tend to cost more, the materials may be less readily available, and construction may take longer.

Another challenge is that renewable energy sources, such as wind and solar, rely on varying weather conditions, which could make green buildings susceptible to fluctuations in energy supply. This also underscores that not all locations are equally suitable for green buildings; proper site selection of an important aspect in successful green building projects.

Many people aren't aware of the benefits of green building both for individuals and the community. The global construction sector focused on green buildings is not well-organized, leading to uncertainties in the availability of eco-friendly materials. Moreover, there's limited access to skilled designers and workers who hold the knowledge and can bring these green structures to life. In this situation, public support becomes imperative for their success.

Government steps for a revolution in green construction

India has taken significant strides in promoting sustainable and energy-efficient building practices through various initiatives and certification programs. The Energy Conservation Building Code (ECBC), introduced in 2007 and revised in 2017 by the Bureau of Energy Efficiency (BEE), sets minimum energy standards for new commercial buildings with a connected load of 100 KW or a contract demand of 120 KVA or more. This code aims to ensure that new commercial structures adhere to energy-efficient principles.

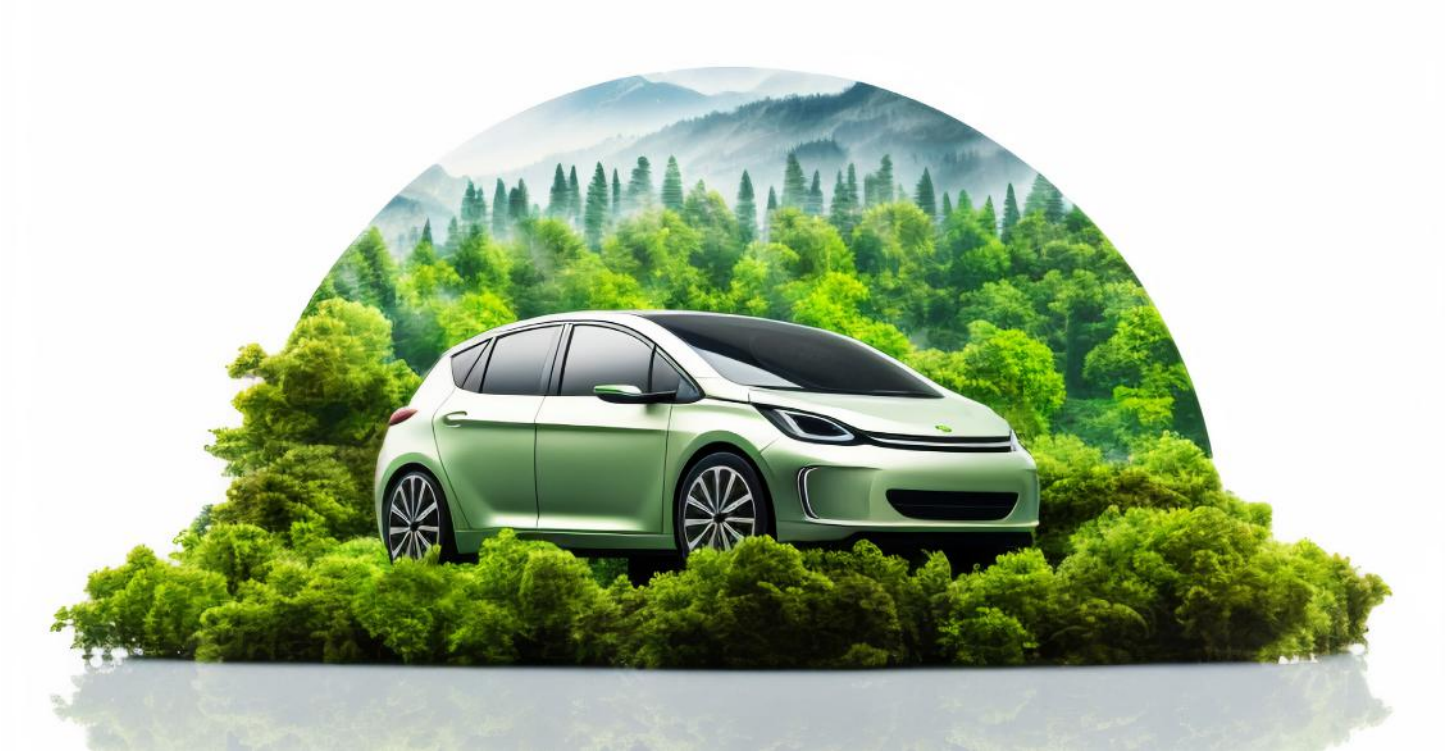
For residential buildings, the Ministry of Power launched Eco-Niwas Samhita 2018, often referred to as the ECBC. This initiative focused on creating affordable and sustainable homes and aligns with the principles of energy conservation, providing guidelines for energy-efficient residential constructions.

The Green Rating for Integrated Habitat Assessment (GRIHA), a system jointly developed by The Energy & Resources Institute (TERI) and the Ministry of New and Renewable Energy (MNRE), employs a five-star rating that is valid for five years. GRIHA evaluates the environmental performance of buildings, promoting sustainable construction practices across the nation.

Evidently, India has recognized the importance of environmentally friendly construction to address the challenges of rapid urbanization and to reduce the environmental impact of buildings. More efforts can be made in the direction of disseminating information about traditional Indian designs and ensuring availability of eco-friendly materials.

The journey into the realm of green buildings unveils a blueprint for a more environmentally responsible and resilient tomorrow. We should embrace a future where structures not only shelter but sustain, ensuring a legacy of balance and stewardship.

Flex fuels Vehicles: The Future of Cars?



In India, efforts have been made to introduce E85 (a blend of 85% ethanol and 15% gasoline) and flex-fuel technology to certain vehicles.

Over the past few years, you've likely heard increasingly more about flex-fuel vehicles. India's automotive landscape is undergoing a transformative shift, and at the forefront of this revolution are flex-fuel vehicles. In 2022, Union Minister of Road Transport and Highways Nitin Gadkari launched India's first flex- fuel car, "Toyota Corolla Altis". The launch is line with India's aim to achieve 20% ethanol blending with petrol by 2025. So, let us understand what are flex-fuel vehicles.

Flex-Fuel vehicles

Flex fuel, commonly referred to as flexible fuel, stands as an alternative fuel blend comprising gasoline and methanol or ethanol. Vehicles categorized as flex-fuel possess internal combustion engines intentionally built to function with multiple fuel variations. These engines demonstrate the capacity to operate using either gasoline or ethanol or methanol.

> These engines demonstrate the capacity to operate using either gasoline or ethanol or

Most components in a flex fuel vehicle are the same as those in petrol-only cars. However, some special ethanol-compatible components are required to adjust to the different chemical properties and energy content in ethanol/ methanol, such as modifications to the fuel pump and fuel injection system.

Why should you choose flex-fuel vehicles?

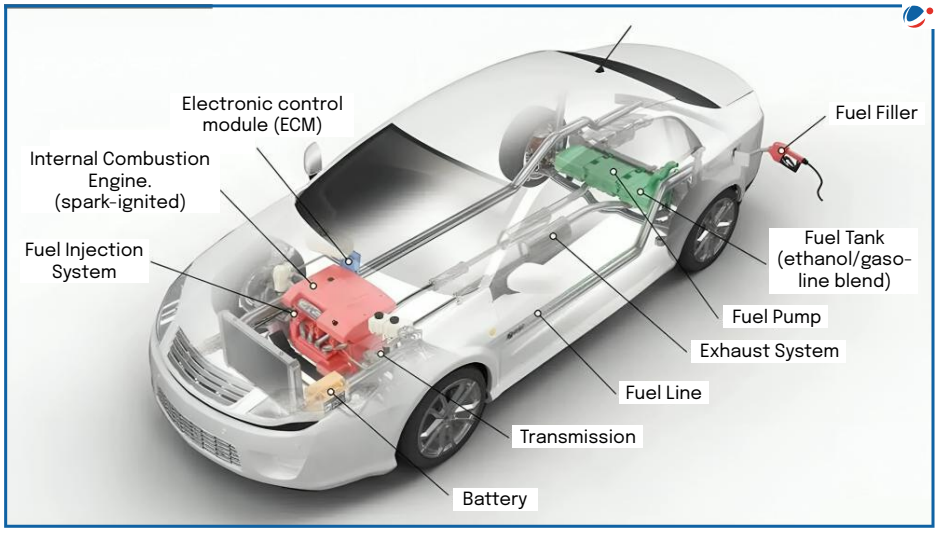
It offers multiple advantages. For drivers, this blend of petrol and ethanol is cost-effective compared to pure petrol, delivering immediate savings. In nations like India, increased ethanol production from sources like corn and sugarcane supports the economy by reducing crude oil imports, benefiting local farmers.

Furthermore, for the planet, ethanol is a cleaner alternative to traditional petrol, leading to reduced emissions and a greener environment when used in vehicles. Despite its economic and environmental benefits, flex-fuel comes with notable drawbacks.

Navigating the Roadblocks to Embrace Flex-Fuel Vehicles

Firstly, including agriculture-derived ethanol in the blend introduces impurities that pose a risk of engine damage. Ethanol's propensity to absorb contaminants can lead to corrosion and harm to engine components.

Additionally, fuel efficiency is a significant concern for vehicle owners. Ethanol-blended petrol, or flex fuel, is known to yield lower mileage compared to pure petrol, ultimately raising the long-term cost of vehicle ownership.



Key component of a flex fuel car

Furthermore, the awareness and infrastructure required to support the flex fuel ecosystem in India remain insufficient. Consequently, procuring flex fuel for flex-fuel vehicle owners remains a challenging endeavour.

> The government aims to achieve 20% ethanol blending with petrol by 2025

Also currently, about 9.5% of ethanol is blended with petrol in India. The government aims to achieve 20% ethanol blending with petrol by 2025, as outlined in its National Biofuel Policy 2018. This ambitious target requires continuous efforts from all stakeholders.

Exciting Pathways for Sustainable Future

To overcome the challenges of lower fuel efficiency of flex-fuel vehicles, electrified flex-fuel vehicles, which offer the advantages of both a flex-fuel engine and an electric powertrain should be introduced.

In transitioning to flex fuels in India, placing consumers at the center is paramount for a successful and sustainable shift. Consumers should be incentivized and made aware of the benefits of flex-fuel vehicles so that the transition towards flex-fuel is smooth.

Through collaborative efforts, innovation, and targeted policies, we can pave the way for a future where flex fuel vehicles become a mainstream and sustainable choice for conscientious consumers.

The road to widespread adoption of flex fuel vehicles may be challenging, but the potential benefits for the environment and energy security make it a journey worth undertaking.

Crossword

Across

4. Alternative fuel blend comprising gasoline and methanol or ethanol

7. Emissions Norms used in India for vehicles

9. Tree also known as red gold

12. Layer protect living being from Sun's Ultraviolet Rays

13. Clouds that occur during the polar winter generally at high northerly latitudes

14. Mix of smoke and fog

15. Longest Mountain Range in the World

Down

1. Raising of trees and agriculture crops on the same land

2. Technique that improves a cloud's ability to rain. or snow

3. Type of gases that absorbs infrared energy (heat energy) emitted from the earth's surfaceand reradiates it back to the earth's surface

5. Pollutant covered under Minamata Convention

6. Technique of growing plants using a water-based nutrient solution rather than soil

8. Second name of solid carbon dioxide

10. Proteins produced by microorganisms that act as biological catalysts by accelerating chemical reactions

11. State known for rat hole mining

Answers
Across - 4. Flex fuel, 7. Bharat Stage, 9. Red Sanders, 12. Ozone layer, 13. Nacreous cloud, 14. Smog, 15. Andes
Down- 1. Agroforestry, - 2. Cloud seeding, 3. Greenhouse gases, 5. Mercury, 6. Hydroponics, 8. Dry Ice, 10. Bio enzymes, 11. Meghalaya

Quiz Zone

Q1. World Air Quality Report, which ranks cities according to the pollution level, has been released by
(a) International Energy Agency (IEA)
(b) Swiss organization IQAir
(c) International Union for Conservation of Nature (IUCN)
(d) United Nations Environment Programme (UNEP)

Q2. Which of the following steps has been taken for the issue of stubble burning?
(a) PUSA decomposer
(b) Bio-methanation plants
(c) National Policy for Management of Crop Residue
(d) All of the above

Q3. Artificial rain is proposed to be a solution to air pollution. Which chemical is used in artificial rain?
(a) Silver Iodide
(b) Alum
(c) Urea
(d) Trinitrotoluene (TNT)

Q4. Lake Titicaca has been in the news because the water level of the Lake has fallen to record-low level. It is located on which of the following continents?
(a) Asia
(b) South America
(c) Europe
(d) Africa

Q5. Ghol has been declared the state fish of which of the following states?
(a) Gujarat
(b) Maharashtra
(c) West Bengal
(d) Tamil Nadu

Q6. Which part of India does the Noa Dihing River flow in?
(a) North India
(b) Central India
(c) South India
(d) North-East India

Q7. GRIHA evaluates the environmental performance of buildings, promoting sustainable construction practices across the nation. It is a system developed by?
(a) Bureau of Energy Efficiency (BEE)
(b) The Energy & Resources Institute (TERI)
(c) U.S. Green Building Council
(d) Indian Green Building Council

Q8. Recently Union Minister, Ministry of Earth Sciences (MoES), Sh Kiren Rijiju, flagged off India's first winter scientific expedition to the Arctic. It was facilitated under which scheme?
(a) Prithvi scheme
(b) Across scheme
(c) Pacer scheme
(d) O – SMART

Q9. India has been removed from Review of Significant Trade (RST) for Red Sanders, under Convention on International Trade in Endangered Species (CITES). This tree belongs which of the forest?
(a) Coniferous Forest
(b) Evergreen Rain Forest
(c) Deciduous Forest
(d) Thorny Forest

Q10. Recently, promenade Beach in Puducherry has witnessed a strange phenomenon where water turned reddish. It was caused by
(a) Harmful Algal Blooms
(b) Climate change
(c) Coral bleaching
(d) Oil spills

Answers: 1-D, 2-D, 3-A, 4-B, 5-A, 6-D, 7-B, 8-C, 9-C, 10-A

Global: Quick Hits

Iceland

Iceland declared a 'state of emergency' after a series of small and medium- intensity earthquakes occurred on the Reykjanes peninsula in the country.

Jurassic Coast
United Kingdom

The skull of a pliosaur has been pulled from cliffs near the coast. Pliosaur is an enormous ancient sea monster (reptile animal). It lived around 150 million years ago. Jurassic Coast is a UNESCO World Heritage Site recognised for its outstanding rocks, fossils and landforms

Lorraine
France

Scientists discovered a potential deposit of naturally occurring hydrogen, or white hydrogen. Deposit has more than half of the world's current annual production of grey hydrogen (hydrogen produced in a factory by processing natural gas).

PACIFIC OCEAN

Lake Titicaca
Peru and Bolivia

A record-breaking heatwave and wildfires have been witnessed in Greece along with other European countries such as Italy, Spain, etc. It is mainly due to the rapid warming and change in the Arctic and mid-latitude weather patterns, including in atmospheric dynamics such as the jet stream.

Andes Mountain Range
Peru

Andes Mountain Range in Peru has lost more than half of its glacier surface in the last six decades. There are some mountain ranges where glaciers have almost disappeared such as Chila. This range is important because the first water that give rise to the Amazon River.

SOUTH ATLANTIC OCEAN

SOUTHERN

Portorož

Slovenia

The 23rd Meeting of the Contracting Parties to the Barcelona Convention (COP 23) was held in Portorož. Barcelona Convention is the only regional multilateral legal framework for the protection of the Mediterranean marine and coastal environment.

Sicily

Italy

Mount Etna volcano erupted by kicking out lava, ash and dangerous gasses. It led to the formation of the ash cloud. Mount Etna is one of the most active volcanoes in the world.

Hunga Tonga Ha'apai Volcano

Studies highlighted short- and long-term changes to the stratospheric chemical composition that have occurred since the eruption in 2022. It is located at Ha'apai Island group of Tonga, a country in the southwestern Pacific Ocean.

Bangladesh

Bangladesh along with the West Bengal and other North-eastern state of India has been hit by the Cyclone Midhili. The name 'Midhili' was given by the Maldives.

Antarctica

United Nations Secretary-General Antonio Guterres visited globally-important Antarctica. Ice in Antarctica is melting at a fast rate due to human-caused global warming.

Meet Sea Buckthorn, the Resilient Superhero of Shrubs

Ladakh secured Prestigious GI Tag for Sea Buckthorn which joined the esteemed company of Ladakh Pashmina, Ladakh Apricot, and Ladakhi Wood Carving

This recognition not only celebrates the unique geographical and climatic conditions of Ladakh but also acknowledges the traditional knowledge and sustainable practices of the local communities.

Meet Sea Buckthorn, the resilient superhero of shrubs, donning vibrant orange berries that pack a punch of health benefits!

> Do you know, Sea Buckthorn is popularly known as 'Wonder Plant', "Ladakh Gold", "Golden Bush" or "Gold Mine" of cold deserts.

Where is it found?

- They typically grow in dry, sandy areas.
- World's natural sea buckthorn habitat is found in China, Mongolia, Russia, most parts of Northern Europe, and the Himalayan region, including the enchanting realm of Ladakh.

Health Benefits

- Rich in vitamin C and essential fatty acids
- Hailed for its immune-boosting qualities,
- Extract used in traditional medicines, skincare potions, and culinary creations.

Ecological Importance

- Display resilience against harsh climates, drought, and high altitudes.
- Deep root system prevents soil erosion in Ladakh's harsh terrain.

Homemade buckthorn soft drink and ripe seabuckthorn berries.

Polar Stratospheric Clouds

Polar stratospheric clouds were recently observed in Norway, Sweden, Finland, and Alaska.

What are Polar stratospheric clouds (PSCs)?

- Clouds that occur during the polar winter, generally at high northerly latitudes.
- Seen when temperatures are very low, lower than -78°C.
- Also known as nacreous or mother-of-pearl clouds.
- Exceptional and rare type of cloud
- Known for their iridescent and luminous aesthetic with a range of hues including pink, orange, and red.
- Formed by microscopic ice crystals scattering sunlight, resulting in miniature rainbows in the sky.
- Destructive to the ozone layer: Ice crystals in the clouds trigger a chemical reaction between the ozone layer and gases such as bromine and chlorine.

PSCs vs. Normal clouds

	Normal clouds	PSCs
Altitude where they develop	10,000 to 15,000 metres high in troposphere	Higher up in the stratosphere at 15,000 to 25,000 metres.
Composition	Liquid water or ice	Ice, solid nitric acid trihydrate (NAT) crystals, supercooled liquid ternary (sulfuric acid/nitric acid/ water) solution (STS) droplets, or combinations

Greening the Horizon: India's Drive for Purity with BS 6 Norms

BS 6: The New Standard for Indian Vehicles were implemented in India in 2020 to regulate air pollution from vehicles

The tale of BS6 norms in India is not just a technical saga but a captivating narrative of environmental consciousness, public health concerns, and the evolution of the automobile industry. Buckle up, and let's delve into this smog-filled past towards a cleaner future.

The Sooty Beginnings

The year is 1996. India's roads are choked with vehicles spewing black smoke, blanketing cities in a toxic haze. Respiratory illnesses rise, and the environment cries for help. Thus, the journey towards cleaner emissions begins with the introduction of BS1 (Bharat Stage Emission Standards), which is loosely based on European emission norms.

> "One key change is the stricter limits for particulate matter (PM) emissions and the introduction of particle number (PN) limits for vehicles with gasoline direct injection (GDI) and diesel engines."

Gradual Progress, Incremental Gains

Over the next two decades, BS2, BS3, and BS4 norms are implemented, each tightening the noose on pollutants. Technology advances and cars become cleaner, but the smog persists. Public pressure mounts, and the government decides to take a giant leap. In 2015, India announced its ambitious plan to skip BS5 altogether and directly adopt BS6, aligning itself with stricter European standards. BS 6 norms were implemented in India in 2020 to regulate air pollution from vehicles. Before India, Japan and South Korea had already adopted advanced emission standards. China was progressively tightening its emission regulations

BS 6 vs. Previous BS Norms: A Tale of Two Engines

BS VI standards bring significant changes compared to the existing Bharat Stage III and IV emission standards. One key change is the stricter limits for particulate matter (PM) emissions and the introduction of particle number (PN) limits for vehicles with gasoline direct injection (GDI) and diesel engines. This aligns with European standards, indicating a widespread use of diesel particulate filters (DPF) to control PM emissions in new diesel vehicles.

Transformative Benefits of BS 6 Emission Norms for a Healthier Environment

Let's look at some major benefits. The shift to BS 6 emission norms not only safeguarded the environment but also opened doors to innovation and sustainable practices. Businesses, too, adapted to this green revolution. Electric and hybrid vehicles became the norm, and industries embraced cleaner technologies. By adhering to BS 6 norms, country positions itself as a global leader in setting high standards for emissions. This leadership role can inspire others to follow suit and adopt similar stringent norms.

BHARAT STAGE-VI
EMISSION STANDARDS

AN OVERVIEW

Bharat Stage Emission Norms Limits

Norm	NO2 Limit (mg/Km)	Particulate Matter (PM2.5)
BS-III	500	50
BS-IV	250	25
BS-V	180	5
BS-VI	80	5

BENEFITS OF SWITCHING TO BS-VI

The gap between emissions from diesel and petrol will narrow down with the reduction in nitrogen oxide emissions and particulate matter.

	NOx emissions (g/km)	PM emissions (g/km)
Diesel Cars	68% ↓	87% ↓
Heavy duty vehicles	82% ↓	67% ↓

Unravelling Public Challenges on the Path to BS 6 Compliance

Automakers swallowed a bitter pill to comply with BS6. Engines underwent intricate surgery, shedding simpler parts for fancy filtration systems and catalytic converters. This technological facelift didn't come cheap, translating into price hikes that shocked some car buyers with sticker shock. Second-hand BS4 vehicles suddenly felt like a tempting, if smoky, escape route.

Petrol cars adapted easily, but diesel engines faced challenges adjusting. So what was the problem? Filters (Particulate matter filters (DPFs) trap soot but can clog in traffic, causing the "check engine" light to appear frequently. Drivers had to choose between clean air or expensive regeneration cycles to unclog the DPF.

Meeting the BS6 norms required cleaner and more expensive fuel. Refineries rushed to upgrade, but there were early issues causing fuel shortages and concerns about adulteration. Some cars struggled with the new fuel, adding to the complaints.

BS6 had its challenges, but it's a step in the right direction. With some adjustments, patience, and maybe a dash of magical fuel additives, we're on the path to a destination of clean air, shiny cars, and a healthier future for everyone.

Do houseplants really purify indoor air?

The NASA Clean Air Study was a project led by NASA in association with the Associated Landscape Contractors of America (ALCA) in 1989, to research ways to clean the air in sealed environments such as space stations.

Have you come across advertisements selling houseplants boasting about air purifying capabilities of different varieties? In this era where 'plant parenting' has emerged as a cultural phenomenon and everyone is engaged in a collective pursuit of cleaner air, the idea of household plants as natural air purifiers has been gaining attention.

However, the question looms large: can these green companions truly live up to their reputation and provide a sanctuary of cleaner air within our homes? Let's examine existing research and explore the mechanisms through which plants interact with indoor pollutants to understand whether incorporating greenery into our living spaces is a truly effective strategy for achieving cleaner, healthier air indoors.

But, before getting into details whether plant purify indoor air or not, let's understand various sources of pollution of indoor air. Indoor air pollution can come from a number of sources. For instance, cooking can generate particulate matters. Volatile Organic Compounds (VOCs) can emerge from chemical cleaners, synthetic coatings in carpet and furniture, etc.

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One famous NASA experiment, published in 1989, found that indoor plants can scrub the air of cancer-causing VOCs like formaldehyde and benzene. Later research has found that soil microorganisms in potted plants also play a part in cleaning indoor air. Based on that research, some scientists claimed that house plants are effective natural purifiers. Bill Wolverton, former NASA research scientist, also suggested that the amount of leaf surface area also influences the rate of air purification. He also recommended some houseplants like Boston fern, Golden Pothos, etc.

Later studies and reviews of previously published scientific studies, however, suggest that the evidence that plants can effectively clean the contaminated air is far from conclusive. According to them, Plants, though they do remove VOCs, remove them at such a slow rate that they can't compete with the air exchange mechanisms already happening in buildings.

Despite the questions raised on the air purification potential of houseplants, they provide a number of other evidence-based health benefits. Studies have shown plants can knock out stress by calming the sympathetic nervous system and can also make people feel happier. Further, research also shows spending time around nature has a positive effect on an individual's mood and energy levels.

Plants aboard the International Space Station

Today, NASA grows plants aboard the International Space Station for fresh food and to "create a beautiful atmosphere," noting their health benefits lie in their ability to improve our mental state. Simultaneously, researchers at the University of Washington are experimenting with genetically modifying plants to better remove VOCs from the air.

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