



# e - Magazine



## Climate Change Forum for Youth in India

Vol -I, Issue -3, May-June, 2021

e-magazine



### Theme: Ecosystem Restoration



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# About CCRI and CCFYI

## CCRI

**Climate Change Research Institute (CCRI)** is a not-for-profit organization registered under Registration Society Act 1860. The website is [www.ccri.in](http://www.ccri.in).

The Institute has been founded with a vision to promote understanding of climate change, mentoring and developing human resource capabilities for finding solutions. The ultimate goal of climate change adaptation and mitigation is to reduce accumulation of greenhouse gas (GHG) emissions in the atmosphere and reduce *carbon footprints*.

The Institute has a mission is to inform youth in schools and colleges about the environment, ecosystem changes and consequences of climate change through awareness and capacity building on topics of scientific & societal interest such as Energy, Health, Water and Air pollution among others.

## CCFYI

**Climate Change Forum for Youth in India (CCFYI)** is a platform for open discussions on the climate change related issues for the youth of our nation. We compliment young authors for their expression to climate change and contributions by articles and posters.

Climate change education is under-represented in the formal education system in India. There's an urgent need of introducing an interwoven integration of environmental knowledge with the learning on how an individual reduce emissions by connecting the dots between major factors of lifestyle and major contributors of the carbon emissions.

The CCFYI aims to build a responsible and environmental citizenship amongst the targeted audience using an interwoven integration of environmental and climate change knowledge sharing, a sense of responsibility and self-awareness about scientific solutions to mitigate the ongoing climatic impacts.

*Climate Change Forum for Youth in India has been actively publishing bimonthly e-Magazine. This is third of the series. We hope you will enjoy reading it, if you want to share your views*

or send any article related to climate change, or if you want to apply for the membership, please feel free to reach us out at [info@ccri.in](mailto:info@ccri.in) or [contactus@ccri.in](mailto:contactus@ccri.in).

## About the e-Magazine

The e-Magazine is a science outreach initiative by Climate Change Research Institute, since the very beginning of year 2021. Our lives took a drastic shift in year 2020 and there was a big full stop on all the activities, as we were locked inside our houses by a microscopic organism COVID-19!

Everything and anything went digital and we all started working from home. The Climate Change Research Institute (CCRI) also resumed its work from home. On 4th September 2020 on the opportune virtual Teachers' day celebration, we decided to launch **Climate Change Forum for Youth in India, with following Aims and Objectives;**

- To raise awareness about environment and climate change, liaise with Climate Change Research Institute and interact with other bodies to achieve the goals.
- To provide members with information and to encourage community participation with climate change solutions in their locality.
- To promote welfare and sustainable development goals.

We opened the free membership of the Forum; anyone within the age bandwidth of 15-35 years could apply for it by responding to Google form. A number of applications from teachers and students from different schools of Delhi-NCR have been received.

Focusing on outreach and youth engagement, the e-Magazine is before you. Since the e-Magazine is started as two-way communication between the members and CCFYI, each issue has a unique theme for knowledge sharing, members' contribution related to each theme and e-News Alerts on climate change.

### Editorial Advisory Board

1. Prof D. P. Agrawal, Former Chairman, UPSC
2. Shri V.S. Verma, Former Member, CERC
3. Shri Suresh Goel, Principal Architect, SGA Labs
4. Prof T Satyanarayana, Div. of Biological Sciences & Engineering, NSTI
5. Shri A. K. Jain, Ex-Commissioner, DDA

### Editor-in-Chief

Dr. (Mrs) Malti Goel, Former Adviser, DST and Chief Executive, CCRI

# Message from the President

***“The Environment is everything that isn’t me”- Albert Einstein***

The planet Earth has already been irrevocably changing due to man-made activities. You and I can and must make a difference. To understand the awareness level of the students and teachers, CCRI conducted a survey on Ecosystem management, the analysis of which is included in this issue.

On 5th June, the world celebrated 50<sup>th</sup> World Environment Day this year. United Nations has declared the decade 2021-30 as the **Ecosystem Restoration Decade**. Oceans have a crucial role in controlling the weather and climate on the Earth. A Webinar campaign was held on 4<sup>th</sup> June 2021, to draw attention to the need for ocean ecosystem restoration.

Through this e-Magazine, I take the opportunity to educate you about the climate change and at the same time, the magazine is a platform for each and every member to express and educate themselves on climate change, interact and reflect. The theme of this issue is **‘Ecosystem Restoration’**. I am glad to receive few of your interesting contributions towards the e-Magazine, there could be more.

I am sure that the members of the forum will come forward and send their entries for the next issue. Soon we will plan to award the best article.

With best wishes,

**Dr. (Mrs.) Malti Goel, President**



Dr. (Mrs.) Malti Goel is President, Climate Change Research Institute. She served as Scientist 'G' in the Ministry of Science & Technology, Government of India, and was engaged in promotion of scientific research and technology development in the emerging areas relevant to the national needs. She was CSIR Emeritus Scientist at Jawaharlal Nehru University and Adjunct Professor at Jamia Hamdard University. She is peer reviewer for Energy and Applied Energy; international journals of Elsevier. She has excelled in science education for Sustainable Development and has received many awards and honors, including Bharat Jyoti Award.



Dr. Malti Goel receiving Bharat Jyoti Award 2012 from Dr. Bishma Narain Singh, former Governor of Tamil Nadu and Assam



Climate Change Research Institute  
Science & Technology Solutions for Sustainable Energy Future

# Environment Day Celebrations 2021

The **World Environment Day 2021** theme this year was “**Ecosystem Restoration**”. The CCRI Campaign was held in association with the **India International Centre** on **4<sup>th</sup> June 2021** having eminent speakers as per programme below.

**India International Centre  
and  
Climate Change Research Institute**



**Webinar on  
Ecosystem Restoration: Ocean and COVID-19**

**Lead presentation: Dr. Malti Goel**  
Chief Executive, Climate Change Research Institute and Former Scientist 'G' & Emeritus Scientist, Ministry of Science & Technology

**Keynote Speaker: Dr. N. Ramaiah**  
Former Chief Scientist, Professor at AcSIR and Deputy Director, CSIR-NIO, Goa

**Co-Chair: Dr M. Sudhakar**  
Former Director, Centre for Marine Living Resources & Ecology, Kochi and Former Adviser, Ministry of Earth Sciences

**Chair: Dr. Hari Narain Srivastava,**  
Former Additional Director General, India Meteorological Department, New Delhi

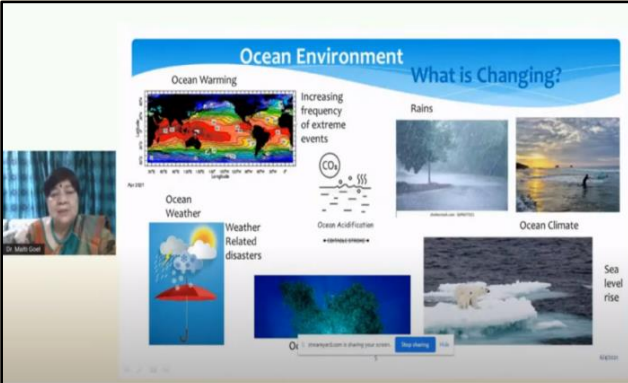
Friday, 4 June 2021 from 4:00 pm to 5:00 pm

Registration link:  
<http://webcast.streaminglive.in/iicwebinar3/signup.php>



**Dr. Hari Narain Srivastava, Former Additional Director General, India Meteorological Department, New Delhi** chaired the event. He said pollution has impacted every aspect of our lives whether it is air pollution, water pollution or noise pollution, it has changed our lifestyle. ***Pollution is the primary concern and in oceans, the main problem of pollution arises due to the plastic waste*** in oceans. He advised that our efforts should be to reduce plastic waste and find new material which could be recycled and made use of in fighting COVID-19.

**Dr. M. Sudhakar, Former Director, Centre for Marine Living Resources & Ecology, Kochi and Adviser, MoES** co-chair and moderator of the event, quipped, ‘*When everybody is at war, I am at peace, when everybody is at peace, I am at war- that is a scientist!*’ He suggested we could have made efforts to go to oceans and collected a very important and critical data during COVID-19. This opportunity come once in a hundred years and could have been utilized by the scientists.






**Dr. (Mrs.)Malti Goel** explaining briefly the ocean environment


**Dr. (Mrs) Malti Goel’s Chief Executive, Climate Change Research Institute** was the lead speaker, said that the UNGA has launched of UN Decade of Ecosystem Restoration from 2021-2030 on this World Environment Day. She said ***oceans store thousand times more heat than the atmosphere and act as climatic buffers***. Due to changing ocean environment, there is increased frequency of extreme events.

The rising temperature of ocean surfaces causes more evaporation and bringing more rainfall. Rising sea levels is another concern, already 7% of land has submerged in last twenty years. She said Government of India has launched national **SagarMala** project to focus on Port led development.


Dr Malti Goel cited examples of two experiments in 1990s namely **Monsoon Trough Boundary Layer Experiment (MONTBLEX)** and Indian Tropical Ocean Global Atmosphere (I-TOGA), conducted to understand monsoon variability and climate change. She said **Ocean deoxygenation is a key issue for humanity impacting marine life and a key driver of coral reef demise into the sea. The current rate of acidification is over 10times faster than it was 35 million year ago and ocean could be 150% more acidic by the end of the century. Coronavirus has been the plastic waste time bomb.** The Ocean, Climate, Human health, Marine ecosystem, and Biodiversity all are interlinked. She summed up by saying we have one ocean and there is no Plan B. Our motto should be **“One Planet, One Ocean, One Health!”**

SagarMala	MONTBLEX
<ul style="list-style-type: none"> <li>• SagarMala is a project of Government of India launched for the comprehensive development of India’s 7,500 km long coastline.</li> <li>• SagarMala aims to bring about a step change in waterways transport by unlocking the full potential of India’s coastline and waterways.</li> <li>• Under the project,towards Port Led Development, a 14,500 km long potentially navigable waterways and maritime industries have been proposed.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center; font-weight: bold;">Reduction of logistics cost for EXIM and domestic trade with minimal infrastructure investment</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <ul style="list-style-type: none"> <li>• Reducing the cost of transporting domestic cargo through optimizing modal mix</li> <li>• Optimizing time/cost of EXIM container movement</li> </ul> </div> <div style="width: 45%;"> <ul style="list-style-type: none"> <li>• Lowering logistics cost of bulk commodities by locating future industrial capacities near the coast</li> <li>• Improving export competitiveness by developing port proximate discrete manufacturing clusters</li> </ul> </div> </div> <p style="text-align: center; font-size: small;">Vision of SagarMala Programme</p> </div>	<ul style="list-style-type: none"> <li>• MONTBLEX is short form of “Monsoon Trough Boundary Layer Experiment”, to the understand monsoon variability in India</li> <li>• The experiment was conducted across the country in 1990, had four 30-metre high observational towers located at CAZRI,Jodhpur, IIT Delhi, BHU Varanasi and IIT Kharagpur, and sea observations in the Bay of Bengal.</li> <li>• It was India’s first national effort to understand the atmospheric boundary-layer processes in the northern India during summer monsoon season.</li> </ul> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p style="font-size: x-small;">MONTBLEX News, a newsletter published from IISc during the experiment (Photo courtesy: Syed Anwarul)</p> </div> <div style="text-align: center;">  <p style="font-size: x-small;">The tower at Jodhpur being erected (Photo: Sushil Kumar)</p> </div> <div style="text-align: center;">  <p style="font-size: x-small;">One of the towers used for MONTBLEX, showing its triangular lattice structure. (Photo: Rishi Kumar)</p> </div> </div>

**Dr. Ramaiah Nagappa, Former Chief Scientist, Professor at AcSIR and Former Deputy Director, CSIR-NIO, Goa delivered keynote address on Post COVID-19 Measures for Sustainable Harnessing of Marine Bioresources.** He further talked about the seven major activities that take place in the coasts of India, like shipping, ports and harbors, marine farming, coastal space, food and drugs, salts and minerals and security which all are commercial, except “security”. **For every kilogram of seafood sold, Carbon Footprint of Product (CFP) left is ~1.44Kg CO<sub>2</sub>.**



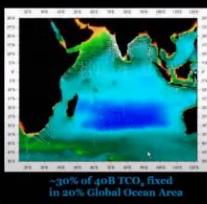
Dr. Ramaiah Nagappa



- ~70 Million km<sup>2</sup>
- Land-bordered North
- Drives Indian Monsoon
- Many major rivers discharge

Indian Ocean

India EEZ: 2.01 Mkm<sup>2</sup>  
3.5Mmt Harvests  
20 M Maritime jobs



~30% of 40B TCO<sub>2</sub> fixed in 20% Global Ocean Area

**Dr. Ramaiah Nagappa during his presentation on “Post COVID-19 Measures for Sustainable Harnessing of Marine Bioresources”**

The world enjoys 620000km boon of coast length of which India has a share of less than 1% (0.8%) and due to more average sea-surface chlorophyll, we get very good quantity of fish. The

ocean life is abundant, ubiquitous, highly diverse, self-sustaining and climate controller. Indian ocean is very dear to us, with 70 million km<sup>2</sup> area, our exclusive economic zone (EEZ) is about 2.01 million km<sup>2</sup>, we have 66% of the earth's landmass and 20 million people are employed in maritime jobs.

Apart from Covid, which is one time event, the biological resources at sea are facing other threats as well as events like ENSO (El Nino- Southern Oscillation), which occur in every to-three years, and others such as pollution, cyclones, tsunami. For the health of our seas, and sustained outcomes, we need to have national cooperation and controlled pollution.

Prof Nagappa concluded by highlighting the 5Is actions to improve marine ecology as

- *Institute,*
- *Implement,*
- *Impart,*
- *Innovative and*
- *Ideas*



Dr. Nagappa quoted a few lines from a poem written by his colleague, Mr. Simon, Personnel Secretary to the Director, NIO

***Man wishes to live long and stay agile,  
The irony, he made his very environment fragile!  
Oh! Now he denied clean air to breathe like a juvenile  
And it forced him to fall prematurely senile!***



# Members' Contribution

## Article on “Eco-DRR” by Komal Bora



### About Komal Bora

Komal has completed her masters in Climate Science and Policy and currently works as Research Assistant at CCRI.

## Ecosystem Restoration and Disaster Risk Reduction (Eco-DRR)

IUCN defines Eco-DRR as “the sustainable management, conservation and restoration of ecosystems to reduce disaster risk, with the aim to achieve sustainable and resilient development.”

In past few years, disaster linked to natural hazards has scaled up and all this is due to the ecosystem degradation. We continue to suffer from a plethora of human induced and natural hazards like flood, landsliding, earthquake, cyclone, drought which costs a country millions as the people, infrastructure and livelihood is adversely affected.

India, is the second most populated country in the world and highly exposed to the natural disasters. The geographical location of India is such that it lies at seismic risk zone and inter-tropical convergence point, India faces the recurring atmospheric phenomenon of drought, heat waves, heavy monsoon rains, floods, landslides, cyclones etc. As per MHA Disaster Management in India Ministry of Home Affairs Report 2011, *almost 59% of India's landmass is prone to earthquakes; over 12% of land is prone to floods; about 76% of the coastline is prone to cyclones and tsunamis; 68% of the cultivable area is drought-prone; and hilly areas are subjected to wet and dry landslides and avalanches. Around 2% of the GDP is lost due to disasters.*

The seven deadliest natural disasters of India were **The Great Bengal Famine (1770), Super Cyclone, Odisha(1999), Gujarat Earthquake (2001). The Indian Ocean Tsunami(2004), Bihar Flood(2007), Uttarakhand Flash flood(2013), Kashmir Floods(2014).**

Ecosystems act as a buffer against hazards, preventing disaster and reducing disaster impact on people, infrastructure and economy. Restoration, conservation and sustainable use and management of wetlands, land, ocean, and other natural resources strengthen disaster and climate risk management. The most vulnerable people in many countries rely on ecosystems for their livelihoods. With all the frequent occurrence of natural hazards, there's need to look into the ecosystem restoration for disaster risk reduction(Eco-DRR) both at local and national levels.

There are a series of international policies which is working towards Eco-DRR like **Sendai Framework for Disaster Risk Reduction(2015-2030)** where ecosystem-based disaster risk reduction (Eco-DRR) was prominently featured in the outcome document; **UNFCCC Paris COP 12** agreement featured ecosystem-based approaches to adaptation and risk reduction; **Convention on Biological Diversity (CBD), COP 12 and 13** both mention ecosystem-based approaches. The CBD is now in the process of developing technical guidelines on Eco-DRR and adaptation; **Ramsar Convention** regards the importance of wetlands to reducing disaster risk; **the First World Forum on Ecosystem Governance, and its declaration** which also features Eco-DRR.

Also, there's a need to understand that, due to its geographical location, India is already highly prone to natural disasters but the human activities are adding more stress, for example, deforested slopes can cause more landslides.

Ecosystem-based solutions can provide DRR services as well as offer *other services of productive and cultural value, which also contribute to building communities' resilience to disasters and climate change impacts.*

# Member's Contribution

## Infograph on Importance of Ecosystem Restoration by Tisya Dewan



### About Tisya Dewan

Tisya is currently studying in 12<sup>th</sup> grade and hope to go aboard for her higher studies. She is an active participant of school's Ecoclub. Her area of interest is sustainability and she is very keen to work in the field of climate change and environment.

**IMPORTANCE OF ECOSYSTEM RESTORATION**

The restoration of ecosystems is intrinsically linked to the restoration of human health.

The COVID-19 pandemic, which has so far caused over a million deaths worldwide, is a poignant reminder of how ecosystem degradation can contribute to the emergence and spread of novel pathogens.

To combat these emerging global conditions and protect the lives of future generations, we need to protect and restore our habitats and biodiversity.

*Decorative elements include a tree icon, a globe, and a leaf icon.*

# Member's Contribution

Poster on “What Earth Says” by Aditi Goel

## About Aditi Goel

Aditi has recently completed her schooling. Her area of interest are air pollution and sustainability.



**Earth is saying:**

ALL I'M ASKING

F



R

IS A LITTLE

Respect



Climate Change Research Institute  
*Science & Technology Solutions for Sustainable Energy Future*

# World Environment Day Quiz



## Theme: Ecosystem Restoration



The World Environment Day is celebrated across the globe on 5<sup>th</sup> June annually. Each year, the theme changes and for this year, it was “Ecosystem Restoration”. According to the United Nations, *"the celebration of this day provides us with an opportunity to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises, and communities in preserving and enhancing the environment."*

For this environment day, United Nations General Assembly launched the “UN Decade on Ecosystem Restoration(2021-2030)” proclaiming the resolution for cation by over 70 countries from all latitudes. This is a call for the protection and revival of ecosystems across the globe, for the people and the nature.

Between 2021 and 2030, the restoration of 350 million hectares of degraded terrestrial and aquatic ecosystems could generate US\$9 trillion in ecosystem services. Restoration could also remove 13 to 26 gigatons of greenhouse gases from the atmosphere. The economic benefits of such interventions exceed nine times the cost of investment; whereas the cost of inaction is at least three times more costly than ecosystem restoration.



*"We are ravaging the very ecosystems that provide us with the food, water and resources we need to survive. The Earth is resilient, but she needs our help"*

- UN Secretary-General Antonio Guterres

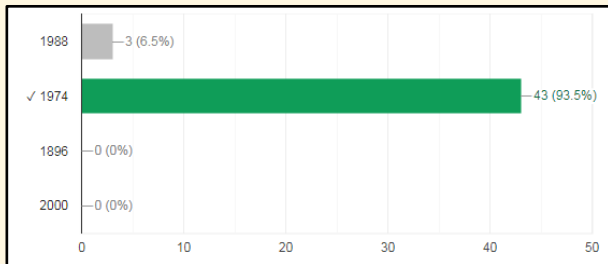


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# World Environment Day Quiz

The Questions, Responses and correct Answers to the Quiz are described below.

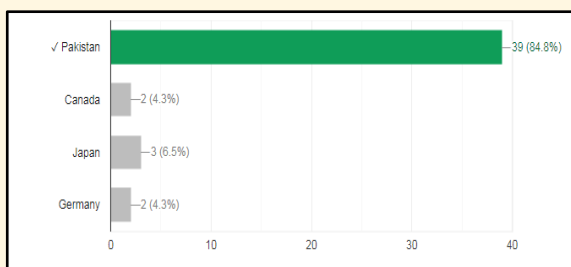
**Question 1: When was the first time the World Environment Day celebrated?**



The correct option is **1974**.

The UN designated 5 June as World Environment Day in 1972. **The World Environment Day for the first time was celebrated in 1974, under the slogan 'Only One Earth'**. It provided a global platform for inspiring positive change in the environment.

**Question 3: Which of the country hosted the “World Environment Day 2021”?**

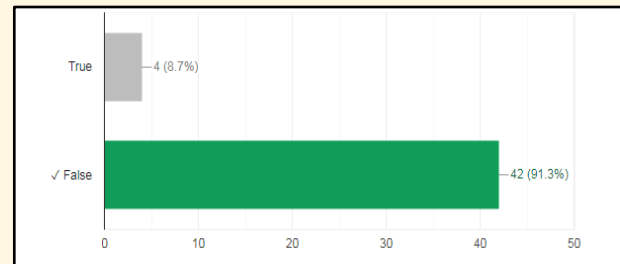


The correct option is **Pakistan**.

Every year, the World Environment Day is hosted by a different country, where, the official celebrations take place, and for 2021 celebrations, the host is **Pakistan**.

*India was the host for the World Environment Day Celebrations in 2011 for the first time and then in 2018.*

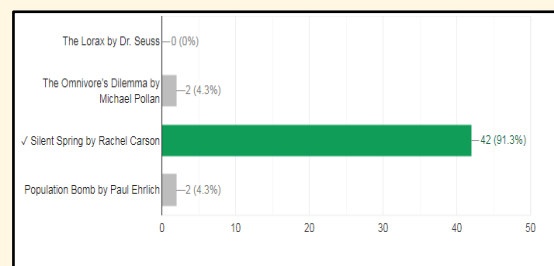
**Question 2: Environment Day is the one and only day during the year that you should care about the environment and act to protect it.**



The correct option is **False**.

No, each day should be celebrated as the environment day and we should take care of our environment and talk about the environmental issues with same enthusiasm as we do on 5<sup>th</sup> June.

**Question 4: Which was the first book to set the stage for society to change in becoming more environmentally aware?**

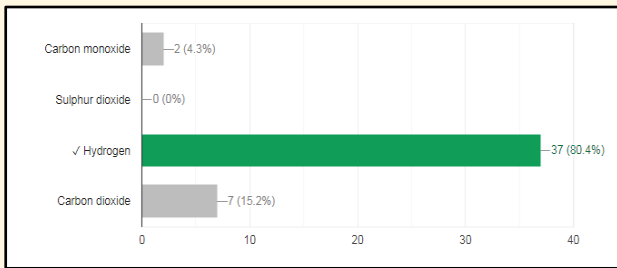


The correct option is **Silent Spring by Rachael Carson**.

This extraordinary book was published in 1962 which highlighted the dangers of DDT (DichloroDiphenylTrichloroethane), first broadly used synthetic pesticide.

Due to the public outrage raised by the book, DDT was banned in 1972.

**Question 5: Which of the following will not cause any atmospheric pollution?**

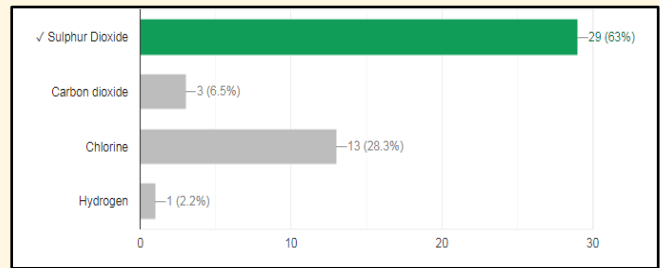


The correct option is **Hydrogen**.

**Carbon dioxide** is a greenhouse gas and the *leading pollutant and the worst climate pollutant*.

*Air pollution costs the world economy about \$5 trillion per year.* It occurs as a result of productivity losses and degraded quality of life, according to a joint study by the World Bank and the Institute for Health Metrics and Evaluation.

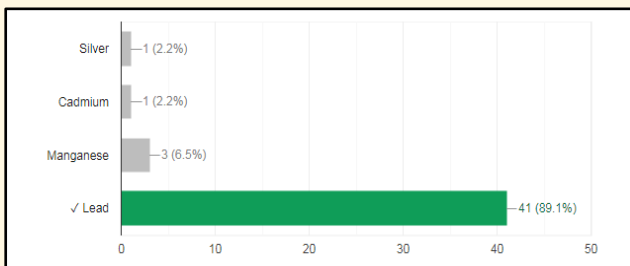
**Question 6: By the effect of which chemical, the Taj Mahal is threatened most?**



The correct option is **Sulphur Dioxide**.

Taj Mahal is one of the seven wonders of the world. Due to Mathura Oil Refinery, which produces the polluting gases like *sulphur dioxide, hydrogen sulphide and oxides of nitrogen, the marble of the Taj Mahal, reacts with these gases and corrode it.*

**Question 7: Which one of the following is the most dangerous metal pollutant of automobile exhaust?**

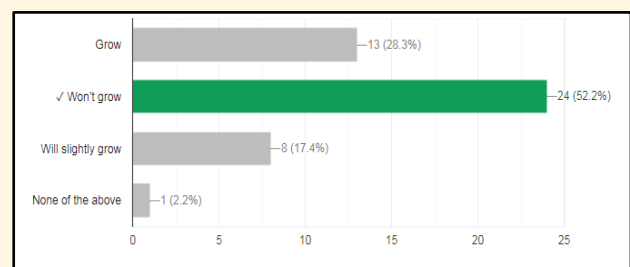


The correct option is **Lead**

Lead (Pb) is released from the automobiles due the combustion of petrol as tetraethyl lead, which is used as an antiknock in petrol.

Lead is very harmful and an increase in its concentration causes lead poisoning (plumbism), effecting the nervous system, kidneys, and liver in adults and can cause brain damage in children.

**Question 8: If there is pollution in an area, the lichens will or will not grow?**



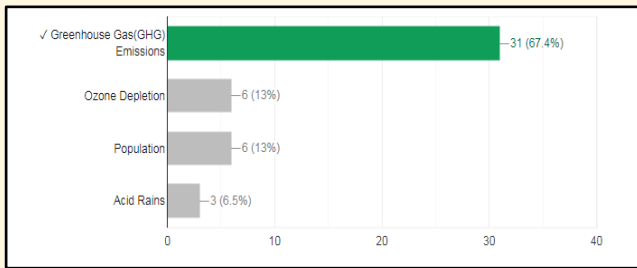
The correct option is **won't grow**.

Lichens is a product of symbiotic relation of an algae(or cyanobacteria) and fungi. **They are the air pollution indicators as they are very sensitive to air pollution.**

**They are also called the bio-indicators.** They grow in pollution free areas and disappear from the polluted areas.



**Question 9: The key to reduce atmospheric pollution is to have a strong control over....**

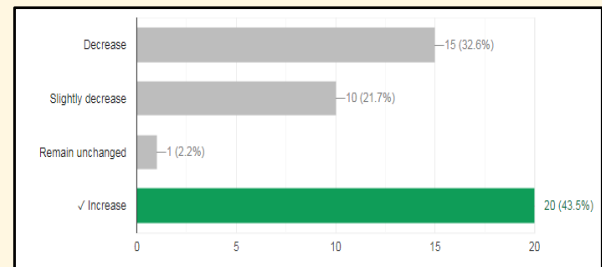


The correct option is **Greenhouse Gas (GHG) Emissions**.

Cutting down greenhouse emission will slower down the climate change, improve the quality of air and as a result, improving the human health.

**One third of deaths in India every year are attributed to increased air pollution.**

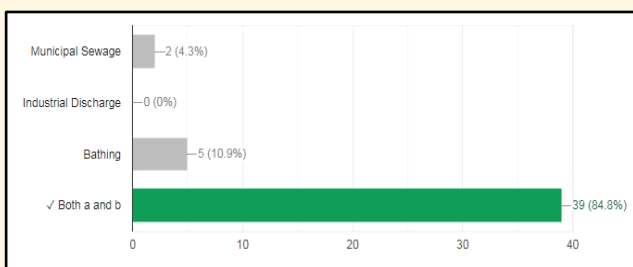
**Question 10: Biochemical oxygen demand (BOD) is the amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in a given water sample at certain temperature over a specific time period. What will happen to the BOD when a huge amount of sewage will be dumped into the river?**



The correct option is **it will slightly decrease**.

Less pollution levels are indicated by BOD below 1500 mg/litre, medium pollution levels are indicated by BOD between 1500-4000 mg/litre and high organic pollution is indicated by BOD level above 4000 mg/litre.

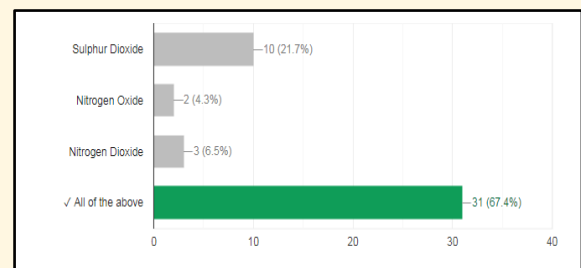
**Question 11 : Water pollution has become a major problem in the world today. It has an adverse effect on both the environment and health. What are the main sources of water pollution in India?**



The correct option is **both a and b i.e., municipal sewage and industrial discharge**.

**In 2018, Central Pollution Control Board (CPCB) identified 351 polluted river in India.**

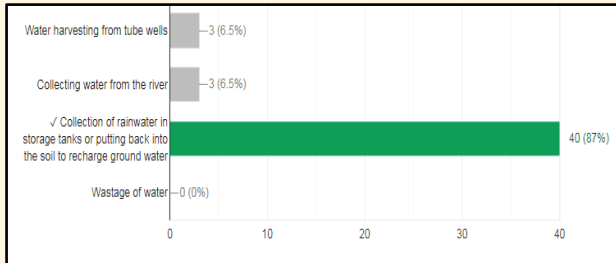
**Question 12 : What are the main the constituent of acid rains?**



The correct option is **all of the above, I.e., sulphur dioxide, nitrogen dioxide and nitrogen oxide**.

According to EPA US, acid rain is a broad term that includes any form of precipitation with acidic components, such as sulfuric or nitric acid that fall to the ground from the atmosphere in wet or dry forms. This can include rain, snow, fog, hail or even dust that is acidic.

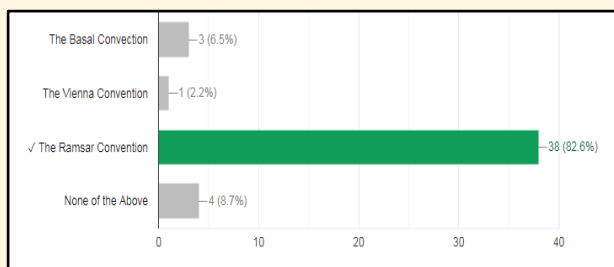
**Question 13: ‘Water harvesting’ has emerged as a sensible method of meeting the water shortfall in a cost-effective manner and is now being applied in most cities to raise the groundwater levels. Water harvesting is the..**



The correct option is **collection of rainwater in storage tanks or putting back into the soil to recharge ground water.**

Water resources in dry environments are becoming scarcer, especially due to the changing climate, rainwater harvesting (RWH) is being reemphasized with calls to revive the practice and restore the ecosystem.

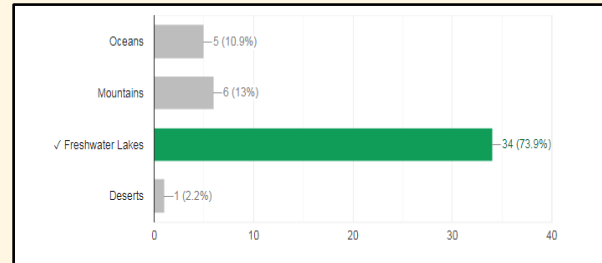
**Question 15: Wetlands are very rich and diverse ecosystems. Of the wetlands of international importance in the world, a large number are subject to moderate or high threat. Which convention signed in Iran protects this specific ecosystem (wetlands) on a global basis?**



The correct option is the **Ramsar convection.**

The Ramsar Convention on Wetlands is an intergovernmental treaty adopted on February 2, 1971 in the Iranian city of Ramsar, on the southern shore of the Caspian Sea. **It came into force for India on February 1, 1982. As on August, 2021, India has 46 Ramsar Sites.**

**Question 14: Eutrophication is the process by which an entire body of water, or parts of it, becomes progressively enriched with minerals and nutrients. Where do we often observe Eutrophication?**



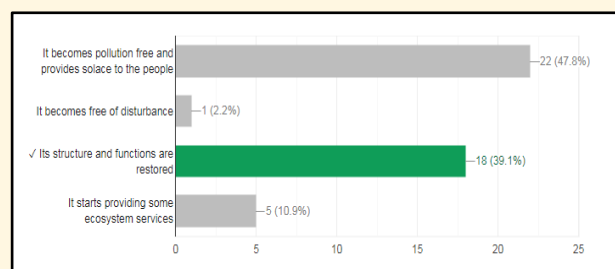
The correct option is **freshwater lakes.**

Eutrophication is a *leading cause of impairment of many freshwater and coastal marine ecosystems in the world.*

Eutrophication is also associated with major changes in aquatic community structure.

**Dead zones** are low-oxygen, or hypoxic, areas in the world’s oceans and lakes and occur because of **eutrophication**

**Question 16: Ecological restoration is the process of rebuilding a degraded ecosystem, till...**

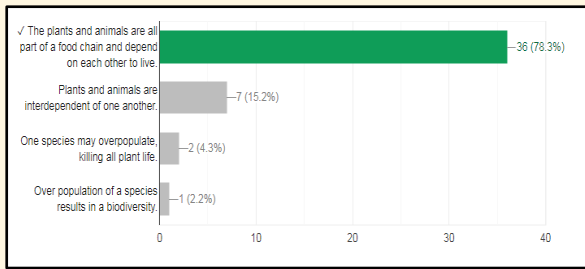


The correct option is **its structure and functions are restored.**

**Ecosystems** are dynamic communities of plants, animals, and microorganisms interacting with their physical environment as a functional unit.

**Ecological restoration** seeks to initiate or accelerate ecosystem recovery following damage, degradation, or destruction.

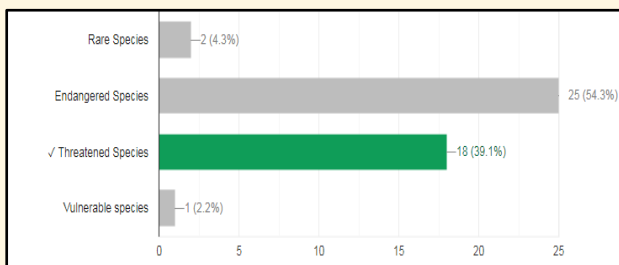
**Question 17: Which best explains why many kinds of plants and animals can live together in an ecosystem?**



The correct option is **the plants and animals are all part of a food chain and depend on each other to live.**

An **ecosystem** is a geographic area where plants, animals, and other organisms, as well as weather and landscape, work together to form a bubble of life. Ecosystems contain biotic or living, parts, as well as abiotic factors, or nonliving parts. Biotic factors include plants, animals, and other organisms

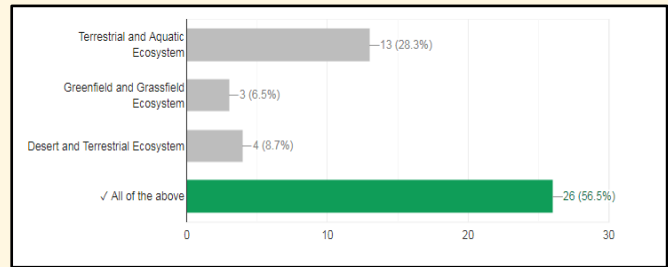
**Question 19: The population of species which is low enough for it to risk of becoming extinct, but not near to extinction is called?**



The correct option is **threatened species.**

The following are the threatened some of the threatened species of India: Asiatic lion, Sarus crane, Common leopard, Great Indian bustard, Himalayan quail, House sparrow, Nilgiri tahr, Gharial, Asiatic lion, Ganges river dolphin, Black-necked crane, Smooth-coated otter, Golden mahseer, Indian pangolin, and Brow-antlered deer etc.,

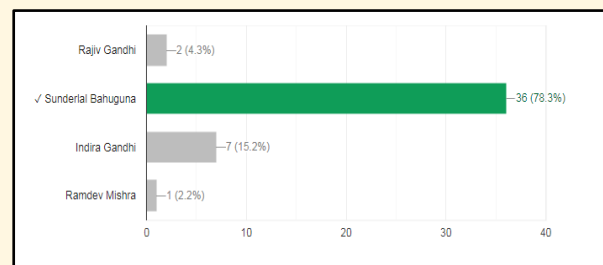
**Question 18: Which of the following are main types of ecosystems?**



The correct option is **all of the above, I.e., terrestrial and aquatic ecosystems, greenfield and greenfield ecosystem, desert and terrestrial ecosystem.**

There are three broad categories of ecosystems based on their general environment: freshwater, ocean water, and terrestrial. Within these broad categories are individual ecosystem types based on the organisms present and the type of environmental habitat.

**Question 20: Who led the “Chipko Movement” in India?**



The correct option is **Sunderlal Bahuguna.**

Sunderlal Bahuguna was *one of the earliest environmentalists of India*. He was the Gandhian who was the driving force behind the Chipko Movement. The movement was started in 1970s in Uttarakhand to save the trees from being cut down by the contractors. Unfortunately, on 21<sup>st</sup> May 2021, we lost this legend due to COVID-19 complications.

# From the Archive

## NESA Article on “COVID-19 and Climate Change

Dr.(Mrs) Malti Goel, President and CEO of Climate Change Research Institute, contributed an article for NESA, e-Version on the topic “COVID-19 and Climate Change”

NESA E-version\_May 2020 (Private Circulation)

### COVID-19 AND CLIMATE CHANGE

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The whole world is taken aback by COVID-19. The new coronavirus case at Wuhan, China was first reported by World Health Organization (WHO) on 31<sup>st</sup> December 2019. In India first case was reported in Kerala on 30<sup>th</sup> January 2020. The WHO acknowledged it a health-borne emergency and on 11<sup>th</sup> March[1], declared it a pandemic. The new coronavirus disease named as COVID-19 is a zoonotic disease. Zoonotic diseases already comprise roughly 70 percent of all human infections. In 2007 WHO had warned that emerging infectious diseases are becoming a growing threat in the face of increasing urbanization, antimicrobial resistance and climate change. In 2003 outbreak of SARS-CoV – Severe Acute Respiratory Syndrome coronavirus created havoc. Middle East Respiratory Syndrome (MERS) virus and Zika virus, a mosquito-borne virus caused other epidemics invaded Middle East and many Asian countries in 2015-16.

A lot has changed with the new coronavirus SARS-CoV2 leading to COVID-19. Lockdown across the world and social distancing are the ways to stay safe. All mobility came to a stop. With 212 countries under the grip of virus. More than three lakhs deaths have been reported in last four months. It is shown that about 80% of infected people get mild to moderate disease, while 14% have severe symptoms and 6% have life threatening episodes of respiratory failure or organ failure. Among the vulnerable population children made up of 2% of the cases, not got severely ill, but aged population above 80 were affected the highest 22%.

A number of studies are appearing about investigating climate change relationship with COVID-19. In this article we examine the atmospheric science and climate change linkages with this global COVID-19 epidemic. The three pronged approach of nexus between COVID-19 and climate could be in terms of (i) Environment, (ii) Weather & climate and (iii) Climate change.

#### (i) Linkage with Environment

Most attention grabbing finding about the environment linkage is that as a result of stay home with the pandemic COVID-19 outbreak; the streets, water bodies and the air all are much cleaner than what we can imagine in our dreams. This year water quality of the rivers Ganges and Yamuna has improved at an incredible level. Himalayan Ranges are visible from a distance of 200 km. More emphasis has been given to air quality in the world's most polluted and busiest cities and it is seen that pollution has dropped like never before. Many cities that had high pollution level are seeing remarkably less air pollution and are breathing clean air. Urban Tree leaves are green and no longer laden with dust and pollution.

NASA pictures released in early March clearly showed that according to the calculations made by the Center for Research on Energy and Clean Air the greenhouse gas emissions in the atmosphere had come down by 25% in the month of February when COVID-19 was at the peak in Wuhan, in comparison to the same period last year. At the same time is no coincidence that NCR of Delhi in India has suffered three earthquakes, though of low intensity, during this period.

Good news about lock down is about energy saving. With closure of offices and industry, the electricity 'peak demand' had fallen by

25% on average after March 22 in India, the day India began fight against COVID-19 with *Janta Curfew*. The NTPC has recently reported that the demand for power has reduced by as much as 45%. By stopping the use of personal cars and other transport means, oil consumption has fallen significantly. Oil is the energy resource which our country imports as much as 85% to meet mainly transport needs. We can save on our imports bill, by investing in renewable energy and avoiding unnecessary travels.

#### (ii) Weather and Climate and COVID-19

The second is, its connection with weather & climate that might be having a role in the growth of virus. Although the origin of corona virus is yet to be ascertained and the whether it is natural or man-made, is a topic of high debate, it was believed that with the coming of summer, COVID-19 might also stop, as is the case with many other viruses, including the common cold, bird flu or influenza occurring during the colder months. Cold weather and humidity are favored by the viruses and as the minimum temperature starts rising above 25-26°C, it starts becoming ineffective. But nothing is proven yet for the new corona virus.

#### (iii) COVID-19 and Climate Change

Are COVID-19 and climate change impacts are linked in any way? The climate change and COVID-19 may not have same origin, but both are global crises and have produced disaster over Homo sapiens. One line of thought is that climate change has led to many wildlife species migrating toward higher altitudes. This potentially is putting animals in contact with new diseases to which they haven't evolved resistance. The change in migratory patterns of the animals could lead to a lower respiratory system in animals. With the environmental devastation these microorganisms which animals host are now being transferred to humans. Bat has been associated with the cause of new coronavirus.

Another theory is that according to findings of Ohio State University scientists from a study of two ice cores extracted from Guliya Ice Cap, northwestern Tibetan Plateau, China and using gene-sharing network is that melting of glaciers giving rise new species of viruses[2]. They found that the microbes differed significantly across the two ice cores, presumably representing the very different climate conditions at the time of deposition. These viruses and bacteria trapped from thousands of years and are still present in the glaciers although in a dormant state. As global temperature raises the re-emergence of ancient viruses threatens present day species lacking immunity to these old world pathogens.

To conclude, with the ongoing debate on whether COVID-19 is natural or man-made, one thing is for sure that in addition to non-communicable diseases and vector borne diseases, viral outbreaks of similar nature would become more common in future with the progression of the climate crisis.

#### References

1. Cucinotta D, Vanelli M. WHO Declares COVID-19 a Pandemic, *Acta Biomed*. 2020 Mar 19;91(1):157-160. doi: 10.23750/abm.v91i1.9397.
2. Zhi-Ping Zhonga, et al. Glacier ice archives fifteen-thousand-year-old viruses, Jan 2020, <https://www.biorxiv.org/content/10.1101/2020.01.03.894675v1.full.pdf>, Preprint accessed on 11.3.2020

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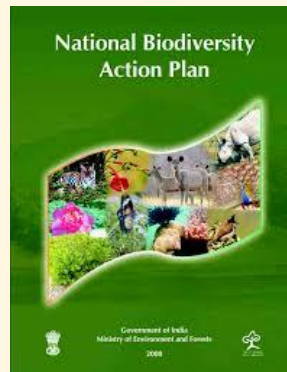


Climate Change Research Institute  
Science & Technology Solutions for Sustainable Energy Future

# Post COVID-19: Future of Biodiversity

In collaboration with the **India International Centre (IIC)**, the **Climate Change Research Institute (CCRI)** conducted a webinar on World Environment Day on 5<sup>th</sup> June 2020.

**Prof. V S Verma, Distinguished professor at Central Power Research Institute, Bangalore** delivered the **Welcome Address**.



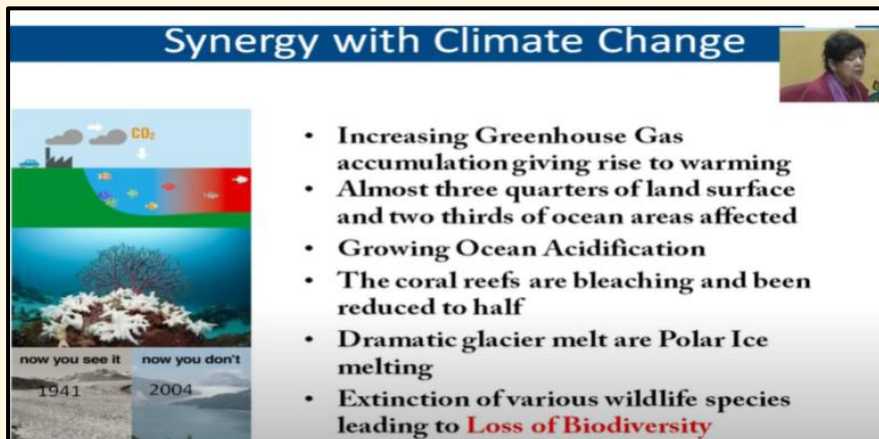
**Dr (Mrs) Malti Goel, President and Chief Executive, Climate Change Research Institute (CCRI)** delivered the invited lecture on "**Post COVID-19: Future on Biodiversity**" as part of World Environment Day celebration on **5<sup>th</sup> June 2020**. This year the Environment day marked the society's unified and digital response to our environmental crisis. **COVID-19 was declared as Pandemic on 11th March 2020**. Due to **lockdown** the event could not take place physically. Amidst lockdown the celebrated the Environment Day. The lecture covered it in four parts, i.e., **COVID-19 and Post COVID-19, Biological Diversity & Conservation, Challenges and Future of Biodiversity**.

**COVID-19** was a huge economic disruption, challenge to food security, migration of casual workers, severe threat to human health, and impact on biodiversity. The **UNEP Conservation of Biological Diversity (CBD) objectives** are;

- Sustainable use of the components of biological diversity
- Fair and Equitable sharing of benefits arising out of the utilization of generic resources

Biodiversity can be Genealogical diversity, Organism diversity and Ecological diversity.

There is **Hippo Decline in Biodiversity**: major causes of decline are habitat loss, climate change and international wild animal trade. Biological Diversity has synergy with climate change and COVID-19.



**Synergy with Climate Change**

- Increasing Greenhouse Gas accumulation giving rise to warming
- Almost three quarters of land surface and two thirds of ocean areas affected
- Growing Ocean Acidification
- The coral reefs are bleaching and been reduced to half
- Dramatic glacier melt are Polar Ice melting
- Extinction of various wildlife species leading to **Loss of Biodiversity**

now you see it 1941 now you don't 2004



Climate Change Research Institute  
Science & Technology Solutions for Sustainable Energy Future

## Biological Diversity in India

India is one of the richest nations in terms of biological diversity. Biodiversity helps in maintaining two most important cycles on earth i.e., Carbon Cycle and Water Cycle. Conservation of biological diversity leads to conservation of essential ecological diversity to replenish soil fertility and preserve the continuity of food chains.

India harbours and sustain immense biodiversity owing to its position in the tropical and subtropical latitudes in the form of ecological habitats like forests, grasslands, wetlands, coastal & marine ecosystems and desert ecosystems.

In 2012, India took over presidency of CBD for two years, and the 11th Session of COP was held in Hyderabad in

## HIPPO Decline in Biodiversity

Biodiversity loss is a major concern and there are predictions that the species are rapidly becoming extinct, and we are moving towards mass extinction of the Planet, which may be sixth extinction in 550 million years.

**HIPPO Decline in Biodiversity** is understood as:

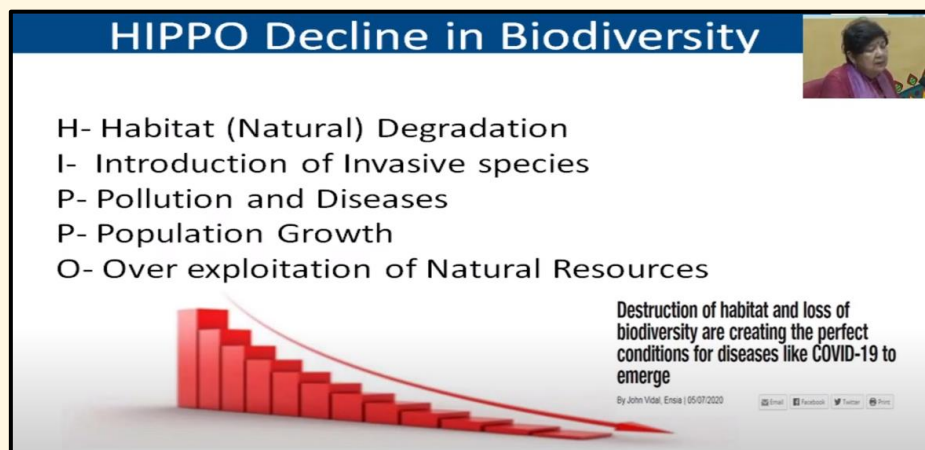
**H- Habitat loss** is a greatest threat to biodiversity. Human activities degrade or completely eradicate areas on which species depend for their food and shelter.

**I- Invasive species** is any non-native organism whose presence negatively impacts one or more native species in each area and affects their population.

**P- Pollution and influx of carbon dioxide** into the atmosphere directly impacts air and water quality, and therefore the health of individual species is affected.

**P- Population increases** are threats to biodiversity causing habitat loss, pollution, and land-use changes.

**O- Over-harvesting** i.e., extraction of resources including trees, plants, and animals that are targeted for their meat or other body parts



**HIPPO Decline in Biodiversity**

- H- Habitat (Natural) Degradation
- I- Introduction of Invasive species
- P- Pollution and Diseases
- P- Population Growth
- O- Over exploitation of Natural Resources

Destruction of habitat and loss of biodiversity are creating the perfect conditions for diseases like COVID-19 to emerge

By John Vidal, Ensa | 05/07/2020

Small icons for Email, Facebook, Twitter, and Print are visible at the bottom right of the slide.

# Beating Plastic Pollution

The **Climate Change Research Institute (CCRI)** organized an Awareness Workshop on “**Implementing Sustainable Development Goals in India: Beating Plastic Pollution**” in New Delhi on 8th June 2018. This echoed the UN World Environment Day theme for the year 2018 “**Beat Plastic Pollution**”.

It emerged that Plastics have extreme versatility and ability to tailor-made to meet very specific technical needs. Plastics have proved to be very useful in all walks of life and their use in food packaging, agriculture, and automobile industry and many others are indispensable.

Plastics can be broadly classified into two categories;

- (a) **Thermoplastics** - Melt when heated, then harden again when cooled, and
- (b) **Thermosets** - cracks or char at high temperatures, ideal for high-heat applications such as electronics and appliances, generate e-waste.

Single use plastics are a topic of great debate, whether it's a boon or a bane. Lightweight plastics have been researched for many years so as to replace conventional materials. India has built strengths in plastic technology and engineering by starting the Central Institute of Plastics Engineering and Technology (CIPET) in Chennai way back in 1968, under the Ministry of Chemicals and Fertilizers. Today CIPET campuses exist in many cities across the country generating skilled manpower.

Plastics use helps in reducing greenhouse emissions during operation of a device, consuming less energy and reducing CO<sub>2</sub> footprints. However, plastics are also a source of greenhouse gas pollution on burning. They add to many other contaminants in the atmosphere. Due to the long life of plastics, approximately 450 years, plastics get disposed on land and collected into landfills. From there it travels to rivers and to oceans, or sometimes directly disposed of in oceans. In oceans, it floats beyond the EEZ of countries and became a trans-boundary problem as marine debris.

**The Institute prepared a Policy Paper and recommended Five Strategies to be adopted at the national level:**

1. **Implementation of Plastics Regulations, both at government and state levels**
2. **Integrated management of plastic waste through recycling and reuse, for implementation of Sustainable Development Goals.**
3. **Controlling plastics pollution in oceans through International Agreement**
4. **Alternate incineration techniques for conversion of plastics into fuel**
5. **Innovation in Technology to produce Bio Plastics or Green Plastics**

A Policy Paper was prepared and circulated to concerned Departments and Government Offices

# e-News on Climate Change

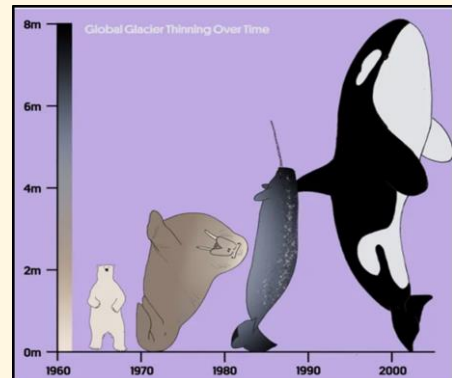
## How glaciers are shrinking at an ever faster pace

Date: May 1, 2021

Published by: The Guardian

*Summary:* The rate at which glaciers have been thinning has accelerated in recent years. The rate has continued to accelerate since then, and in the early 2000s, the most recent data set available, glaciers were on average 8 metres thinner than they had been 50 years earlier. It is certain that they have only grown thinner since.

[Read more...](#)



## Glacial lakes threaten millions with flooding as planet heats up

Date: 2 May 2021

Published by: The Guardian

*Summary:* As the planet warms and glaciers recede, melt water accumulates and forms lakes, often as a result of ice or moraine acting as a dam. Some lakes are more dangerous than others, and more likely to result in what are known as glacial lake outburst floods (GLOFs). The correlation between rising temperatures and glacial lake outburst floods is complicated.

[Read more...](#)

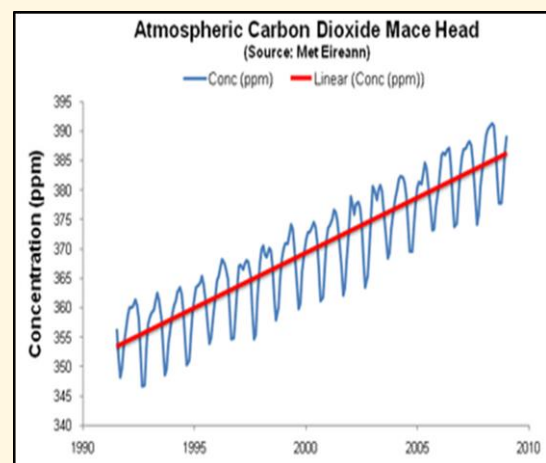
## Transforming atmospheric carbon into industrially useful materials

Date: May 6, 2021

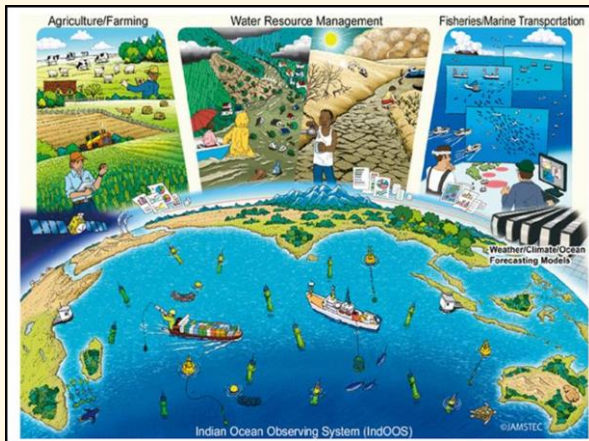
Published by: Science Daily

*Summary:* Plants are unparalleled in their ability to capture carbon from the air, but this benefit is temporary. Researchers have proposed a more permanent, and even useful, fate for this captured carbon by turning plants into a valuable industrial material called silicon carbide (SiC). A new study from scientists quantifies this process with more detail than ever before.

[Read more...](#)







## Improved monitoring proposed in the Indian Ocean as climatic and oceanic changes increase

Date: 7 May 2021

Published by: [India.Mongarbay](#)

*Summary:* There is a need to urgently develop a more resilient and capable observing system to factor in the accelerating pace of climatic and oceanic change. Although the smallest of the major oceans on Earth, the Indian Ocean is the fastest-warming tropical ocean, it has accounted for 30% of the global oceanic heat content increase over the last two decades, while it is home to 30% of the world's coral reefs and 13 percent of global wild-catch fisheries

[Read more...](#)

## Climate Change & India

Date: 9 May 2021

Published by: [Daily Pioneer](#)

*Summary:* A rapidly growing and changing country like India should focus on avoiding emissions by setting key sectors on a low carbon growth path, with robust climate institutions and laws. India is one of the fastest growing economies with third highest GHG emissions in the world. According to the Ministry of Earth Sciences (MoES), India's average temperature has already risen by 0.7°C between 1901 and 2018 due to Green House Gas (GHG) emissions and is expected to rise by 4.4°C by 2100.

[Read more...](#)



## How climate change is slowing the hum of India's windmills

Date: 16 May 2021

Published by: [Live mint](#)

*Summary:* Monsoon gusts that drive wind farms are inexplicably slowing. India's renewable energy transition is at stake. The slow wind speeds during the last monsoon, experts are blaming climate change catalysed by global warming and erratic rainfall patterns.

[Read more...](#)

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## Climate change: Food production in Africa's Sudano-Sahelian Zone under threat, finds study

Date: 17 May 2021

Published by: [Down to Earth](#)

*Summary:* The Sudano-Sahelian Zone in Africa is the most vulnerable to climate change. The associated risks have pushed food crop as well as livestock production outside safe climatic space (SCS), in turn jeopardising food security in the region. The region, one of the poorest in the world, is characterised by fluctuating rainfall and droughts.

[Read more...](#)



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## Global food security: Climate change adaptation requires new cultivars

Date: May 18, 2021

Published by: [Science Daily](#)

*Summary:* Climate change induced yield reductions can be compensated by cultivar adaptation and global production can even be increased.

[Read more...](#)

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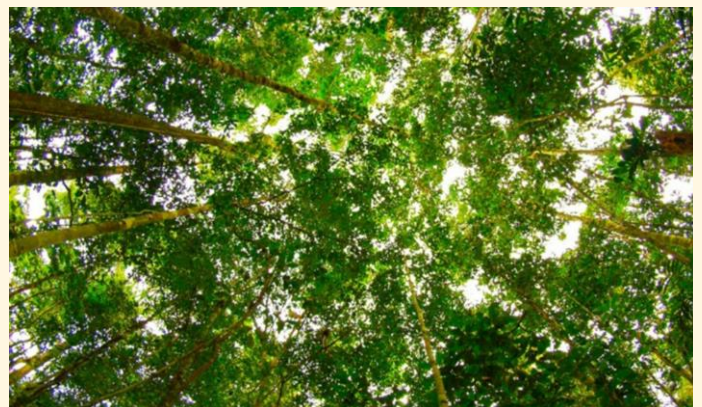
## Forests and climate change: 'We can't plant our way out of the climate crisis'

Date: May 20, 2021

Published by: [Science Daily](#)

*Summary:* Some climate activists advocate large-scale tree-planting campaigns in forests around the world to suck up heat-trapping carbon dioxide and help rein in climate change.

[Read more...](#)



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## Widespread coral-algae symbioses endured historical climate changes

Date: May 26, 2021

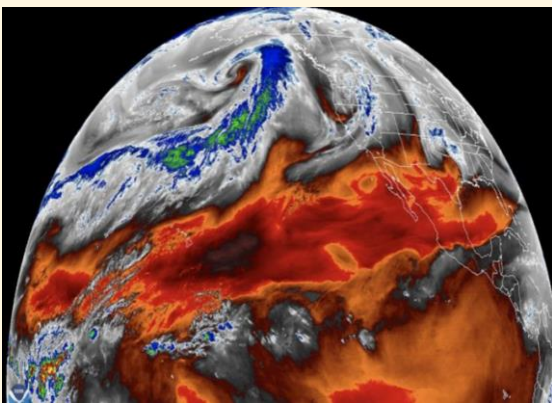
Published by: Science daily

Summary: One of the most important and widespread reef-building corals, known as cauliflower coral, exhibits strong partnerships with certain species of symbiotic algae, and these relationships have persisted through periods of intense climate fluctuations over the last 1.5 million years, according to a new study.



[Read more...](#)

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## Satellites May Have Underestimated Global Warming in the Lower Atmosphere Over the Last 40 Years

Date: May 30, 2021

Published by: Scitech Daily

Summary: Satellite measurements of the temperature of the troposphere (the lowest region of the atmosphere) may have underestimated global warming over the last 40 years. If climate model expectations of these relationships between tropical temperature and moisture are realistic, the findings reflect either a systematic low bias in satellite tropospheric temperature trends or an overestimate of the observed atmospheric moistening signal.

[Read more...](#)

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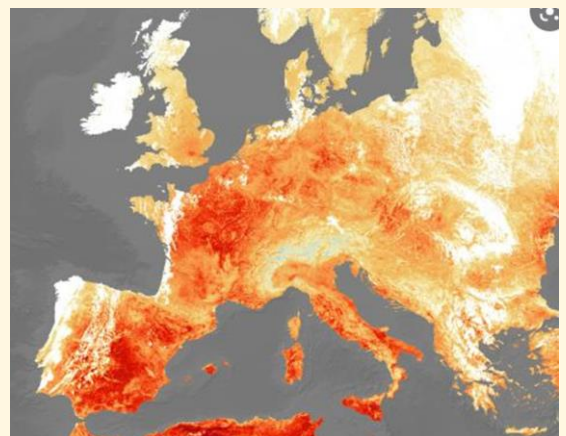
## Record-breaking temperatures more likely in populated tropics

Date: 02 June 2021

Published by: Science daily

Summary: New research shows that most extreme heat events are going to occur in the tropics rather than the poles. Raw temperature data over the polar region reveals a huge range in temperature. Over the tropics, where it's warm and humid, raw temperature data reveals smaller temperature fluctuations.

[Read more...](#)





## Climate change increases extreme rainfall, chance of floods: Experts

Date: 07 June 2021

Published by: IndiaTV News

*Summary:* Climate change will continue to cause an increase in the intensity of extreme rainfall that can lead to severe flooding. Efforts to limit warming to +1.5C will help limit changes in extreme rainfall, though some societal adaptations will still be required. More intense rainfall extremes coupled with changes in other factors could increase the frequency and severity of flooding in many regions.

[Read more...](#)

## Soot from heaters and traffic is not just a local problem

Date: June 10, 2021

Published by: Science daily

*Summary:* Soot particles from oil and wood heating systems as well as road traffic can pollute the air in Europe on a much larger scale than previously assumed. The evaluation of the sources during a measuring campaign in Germany showed that about half of the soot particles came from the surrounding area and the other half from long distances. This underlines the need to further reduce emissions of soot that is harmful to health and climate.

[Read more...](#)



## Cleantech, energy efficiency push in India's climate action plan

Date: June 17, 2021

Published by: Times of India

*Summary:* An inter-ministerial panel will lay the roadmap to institutionalise deployment of low-carbon technologies and push energy efficiency in emission-intensive industries as plan to reduce CO<sub>2</sub> emission. The climate change performance index of 2020 rates India as among the 10 highest performers for climate action and rates India very high for well below 2 degrees rise in temperature.

[Read more...](#)

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## **New modeling technique shows greater likelihood, frequency of urban extreme heat events**

**Date:** June 21, 2021

**Published by:** Science daily

*Summary:* This model addresses the fact that most traditional climate models effectively ignore cities entirely, causing them to underestimate the frequency and severity of urban heat waves. Urban areas make up only 2-3% of the earth's land, so their effect on global models is negligible, but more than half of the world's population lives in urban areas, so their impact is significant.

[Read more...](#)



## **Unchecked climate change will cause severe drying of the Amazon forest**

**Date:** June 22, 2021

**Published by:** Science daily

*Summary:* Amazon rain forests could be at far higher risk of extreme drought than previously thought, according to new research. Huge areas in the eastern part of the Amazon face severe drying by the end of the century if action is not taken to curb carbon emissions.

[Read more...](#)

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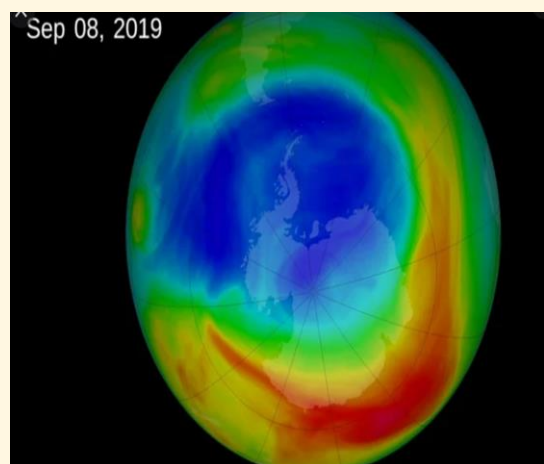
## **Rising greenhouse gases pose continued threat to Arctic ozone layer**

**Date:** June 23, 2021

**Published by:** Science daily

*Summary:* A new study shows that extremely low winter temperatures high in the atmosphere over the Arctic are becoming more frequent and more extreme because of climate patterns associated with global warming. The study also shows that those extreme low temperatures are causing reactions among chemicals humans pumped into the air decades ago, leading to greater ozone losses.

[Read more...](#)





## Mumbai to have its own climate action plan by October

Date: June 25, 2021

Published by: Hindustan Times

*Summary:* The city is set to have its own dedicated climate action plan by October, ahead of the 2021 United Nations Climate Change Conference (COP26). The action plan is being undertaken pursuant to Mumbai's entry into the C40 Cities climate leadership group in December last year. Mumbai's action plan will be executed in seven broad steps

[Read more...](#)

## Extreme rainfall in June may lead to longer flood duration in India, warn experts

Date: 28 June 2021

Published by: Down to Earth

*Summary:* Global warming, urbanisation and loss of traditional flood control reservoirs may be among the reasons behind the anomaly. Himalayan rivers of Uttarakhand, Uttar Pradesh and Bihar reached near danger mark in mid-June. States such as Gujarat and Goa in the western region and Assam in the northeastern region are already experiencing floods.

[Read more...](#)



## How climate change 'loads the dice' for heat waves

Date: 29 June 2021

Published by: NBC News

*Summary:* With global warming making heat waves and other extreme weather events both more likely and more severe, this week's sizzling temperatures may herald a climate reality that scientists thought was still decades in the future. Across the western United States, more than 35 cities tied or set temperature records, with several places shattering their all-time highs

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**CORONA has no Gender Bias**  
***So wear your Make-up, YOUR MASK!***



**Maintain Social Distancing**

***Climate Change Research Institute***

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