

# GEMS BIO VISION

Volume

3

ISSUE 2

ISSUE ON

## Global warming and climate change



DEPARTEMENT OF BIOTECHNOLOGY  
IMS ENGINEERING COLLEGE  
GHAZIABAD

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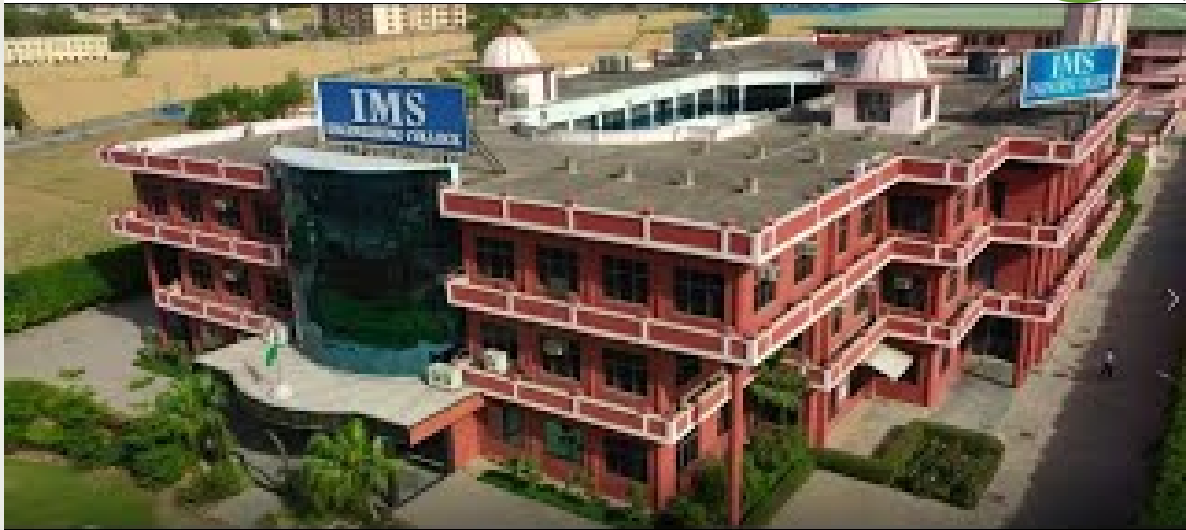
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## IMS Engineering College, Ghaziabad

NAAC Accredited & NBA Accredited Programme  
Approved by AICTE New Delhi & Affiliated to AKTU, Lucknow  
Under the aegis of IMS Society, Ghaziabad



## VISION

To make IMSEC an Institution of Excellence for empowering students through technical education coupled with incorporating values and developing engineering acumen for innovations and leadership skills for the betterment of society.

## MISSION

- To promote academic excellence by continuous learning in core and emerging Engineering areas using innovative teaching and learning methodologies.
- To inculcate values and ethics among the learners.
- To promote industry interactions and produce young entrepreneurs.
- To create a conducive learning and research environment for life-long learning to develop the students as technology leaders and entrepreneurs for addressing societal needs.



## From the Desk of the Director

It gives me immense pleasure and a sense of great pride that Department of Biotechnology at IMS Engineering College is coming up with the 3rd Volume of the GEMS society magazine, Bio vision, on Global Warming and Climate change. Over the years Global warming and climate change have come-up as the two of the most pressing issues being faced by mankind. These phenomena have led to an increasing threat to the survival of plant and animal life on earth. Research in these fields and allied streams now form an integral part of every nation's policy and plays a very significant role in finding appropriate solutions and technologies to the challenges, especially in the context of human health and associated socio-economic problems.

Creating an awareness in the society and making people aware about the deleterious effects of climate change should be the first step to contain global warming and climate change. I firmly believe in nurturing young talent and creating an interest in the minds of students by providing a platform such as the magazine for presenting their views on the topic would be a welcome move towards it. This magazine will surely go a long way in ensuring the exposure of budding geniuses on a single platform.

I also take the time in extending my warm wishes to all the contributors, editorial team members and the department for addressing such an important aspect and I wish to see further such topics being brought up in forthcoming issues. My best wishes to the entire team.

**Prof. (Dr.) Vikram Bali**  
**Director, IMSEC**



## From the Desk of the Editor-in-Chief

Climate change has been the biggest challenge being faced by humankind in the 21st Century. Past few decades have been marked by record temperature increase across the globe, particularly Europe, America and Central Asia. Heat anomalies have pushed the temperatures beyond the acceptable norms. This has been due to the increased greenhouse emissions from human settlements, automobiles and industries. Such type of events massively effects human societies in adversely complex & multiple ways. Climate change results due to complex process of transformations in the society, which need to be understood with the challenges it presents. Climatic conditions play a crucial and significant role by interfering people's lives in multiple domains. The impacts are essentially known and based on unequivocal human action. All solutions related to these global problems are associated with human decision and action. It is social and human action at the level of individual and social structure, which may play decisive role in conditions adversities, arising due to climate change. In addition, this expected impact, in the most diverse social, economic as well as environmental sectors and global human health has emerged as the most important area of concern with alarming situation. Climate change and global warming will have extensive implications to mankind which reflects on to the social structures and other walks of life. These effects of climate change cannot be ignored, since global issues endanger society and nature alike. Participation of every individual can help in significantly resolving these issues to make earth a better place for humankind and other living entities. In this issue of Biovision we are highlighting the key issues of global warming and climate change and possible remedies also. I hope that this issue will be helpful to enrich their knowledge.

**Dr. Santosh Kumar Mishra**  
**HOD Biotechnology Department**

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# ABOUT BIOTECHNOLOGY DEPARTMENT

The Department of Biotechnology was established in the year 2002 with a clear vision of educating students with latest technology in the growing field of Biotechnology as an undergraduate course. Now the department is NBA accredited and also offers postgraduate program (M.Tech). Since its inception, the Department has continuously grown and taken initiatives to impart quality education and inculcate research aptitude in Biotechnology students. The department is actively engaged in research activities in various areas of Biotechnology and related fields. It is also an authorized research center for Ph.D. program through AKTU, Lucknow. The department has consciously taken a decision to strengthen research activity in various areas of Biotechnology with a view to develop practical solutions to problems faced by industries. The department is unique in having established expertise across a broad range of scientific disciplines, thereby encouraging innovative approaches to teaching and research. Our expert faculties in various disciplines also provide research consultancy in Environmental Biotechnology with a view to develop practical solutions to environmental problems faced by industries and the municipalities. Besides this, other areas such as animal biotechnology, plant biotechnology, microbiology, biochemistry, immunology etc are also covered for consultancy and technical support.

## **Government Funded Projects:-**

- 1) DST SERB-TARE (Government of India) funded research project entitled “PfSEA1 antigen characterization as potential vaccine candidate against human malaria parasite Plasmodium falciparum” is ongoing in the Biotechnology Department.
- 2) A consultancy project of UP pollution control board for monitoring of ambient air quality of Hapur city is also ongoing in the department.

## VISION OF DEPARTMENT

To nurture graduates with excellent theoretical knowledge and practical skills in Biotechnology and make them globally competent in area of innovative research and technology.

# MISSION OF DEPARTMENT

- To impart quality education to the students and enhance their skills which will make them globally competitive.
- To achieve high success rate for students striving for higher studies, jobs and entrepreneurship.
- To generate quality work force and knowledge base for biotechnology industry, education, research and development based on national values, social awareness and conscience.
- To work towards application of biotechnology for alleviation of human sufferings and welfare of society and nation.

## PROGRAM EDUCATIONAL OBJECTIVES

- To prepare biotechnology graduates for a successful technical and professional career as per the needs of the biotechnology industry.
- To inculcate life-long learning of biotechnological concepts and ethical attributes in students for a successful technical and professional career
- To create opportunities and a supporting infra structure for students through laboratory courses, projects, dissertations and possible entrepreneurial ventures in Biotechnology
- To develop scientific interest in students and encourage them to pursue entrepreneurship, higher education and research.
- To produce globally competent biotechnologists with enhanced technical acumen, aptitude, communication and professional skills.

## PROGRAM SPECIFIC OUTCOMES

- To impart an ability to apply biotechnology skills and its applications in core and allied fields through use of innovative scientific methods.
- To strengthen students with the concepts and research aptitude for their higher career in the field of biotechnology and develop their scientific interest.
- To inculcate in-depth knowledge in students and update them in various thrust areas of biotechnology, so as to meet the demands of industry and academia.



# ABOUT GEMS SOCIETY

GEMS (Genetic Engineers and Molecular Scientists), the professional society of Biotechnology department was established in the year 2008. The aim of this society is to encourage students for various professional as well as social activities. These activities of this society provide students a platform where they can excel their talent in the area of science and technology with better understanding of their professional & social responsibilities. It also helps students to show leadership skills well as team work culture in among students Faculties of department constantly providing guidance necessary support students for organizing various activities of societies. GEMS Society is constantly working to organize various techno-cultural events for overall development of students. Every semester this society organizes events like Guest lecture from experts, Seminars, Innovative idea presentation, Bio fiesta (Annual techno cultural event), Plantation of herbal plants etc. Expert from industry and research institute like CDRI, BIBCOLD, DABUR Research foundation, Sun Pharmaceutical Industries, Codon Biotech, Envirotech etc. delivered invited talk in the various activities organized by GEMS society. The structure of this society is as follows:

President : Dr. Santosh Kr. Mishra (HOD, BT)

Coordinator :Dr. Indu Bhatt (Assistant Professor)

Vice President : Ms. Brinda Bisht (Student of BT 4th Year)

Secretary : Mr. Harshit Sharma (Student of BT 3rd Year)

Joint Secretary : Ms. Priya Mishra (Student of BT 2nd Year)

Members of GEMS : All students and Faculty members of Biotechnology  
Department

# ABOUT THE FACULTY



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# GREENHOUSE EFFECT



Name- Nimish Srivastava  
Branch- Biotechnology  
Year- 3rd(2020-24)

## Introduction:

Global warming nowadays is a challenging problem which arises due to burning of fossil fuels like coal, oil, gas, and also by deforestation due to which there is emission of greenhouse gases such as carbon dioxide.

This results in rapid increase of temperature which will be more than the earth average temperature.

The primary reason is due to rapid increase of temperature is greenhouse gases and the effect is called greenhouse effect.

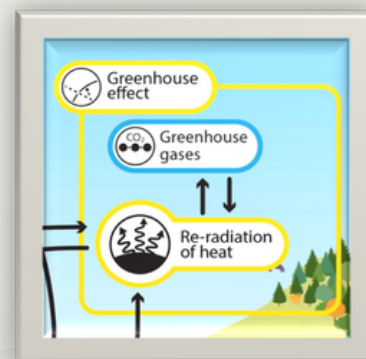
In the end, humans are facing a lot of problems due to climate change, it is not possible to stop global warming, but we could try to reduce or slow down.

In the graph in which at Y coordinate there is temperature and at X coordinate year changes from 1880 to 2000. The average temperature of the surface increases.

## Main cause of Greenhouse Effect:

The radiation in sun is created at the center of sun. When 2 hydrogen atoms combine to form helium atom then

the difference of nuclear energy changes due to which gamma rays are created. These gamma photons while moving to the surface of sun would only have X-ray and UV rays even containing visible rays. When the solar radiation enters the earth surface the re-radiation occurs due to gases like CO<sub>2</sub>. Due to which the short wavelength that is visible and IR rays some parts could not escape causes increase in average temperature due to greenhouse gases. This whole phenomenon is called greenhouse effect.

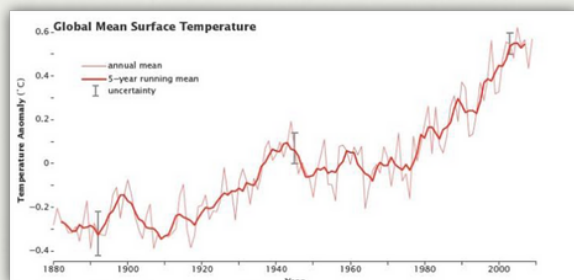


## Variation of parameters with time

There are various parameters like temperature and Carbon dioxide which changes with time. The graphical data shows the gradual increase in both temperature and carbon dioxide.

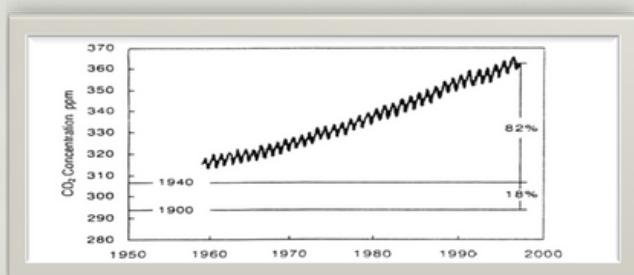
- **Temperature:** Due to the greenhouse gases

the average temperature goes on increasing from 1880 to 2000 and according to many scientists our present global temperature would be 5°F without any greenhouse gasses but in contrast the temperature is 59°F.



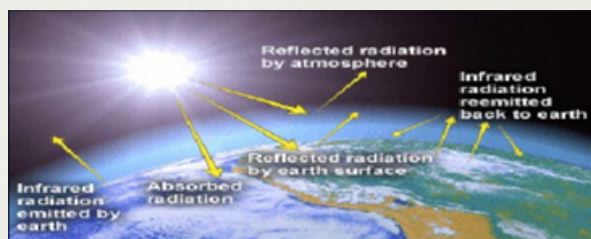
- **Carbon dioxide:** Carbon dioxide is a type of greenhouse gas which average concentration increases with time (in year) in ppm. This is due to the fact of conversion of the earth crust carbon into carbon dioxide. Hence this results in increase in average temperature

**Consequences of greenhouse effect:** the increase of greenhouse gasses ultimately results in climate changes and global warming effects. If greenhouse effects continues it could leads to rise in sea levels. It could also leads to acidification in ocean.



## Conclusion :

Greenhouse effect is a effect which occurs due to greenhouse gasses such as carbon dioxide. From the two graphs it could be easily concluded that increase in carbon dioxide concentration leads to increase in average temperature. This increase in temperature is done due to re radiation of IR and visible light from the greenhouse gasses.



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1. Global warming John Houghton1 Published 4 May 2005 • 2005 IOP Publishing Ltd
2. Re-radiation of heat <https://ugc.berkeley.edu>
3. Global Warming By Holli Riebeck Design by Robert Simmon June 3, 2010
4. Greenhouse Effect: Greenhouse Gases and Their Impact on Global Warming from Research gate
5. Global Warming: Are We Confusing Cause and Effect? LEONID F. KHILYUK, GEORGE V. CHILINGAR

# IMPACTS OF CLIMATE CHANGE ON BIOMES



Name- Ananya Bhaskar  
Branch- Biotechnology  
Year- 2nd(2021-25)

## INTRODUCTION-

This paper briefly estimates the impacts on the biome scale, due to the implications of climate change. Studies show that various human activities like, generating power, manufacturing food, cutting down forests, using transportation etc, are resulting in changes in global climate. Effects like, rise in sea levels, storm surges, flooding and drought incidences in the different regions due to the fluctuation in the precipitation level, have been one of the broadest concerns over the past few decades. Minute disruptions in the weather pattern can create huge disturbances among flora and fauna on individual, population, species, ecosystem and biome scales.

## Impacts on the fauna due to the climate change-

### 1) Impacts on bird-

Birds have an iconic status throughout the world for being a good bioindicator

of an ecosystem quality and productivity. For example, seabirds have been considered as a bioindicator for marine ecosystem. But recent studies show, the recent long-term rise in the temperature of oceanic water in the west coast of the Americas has resulted in the abundance of fishes, which ultimately leads to the starvation of seabirds. Over the past few decades, ornithologists have been concerned about the impacts of weather disruption on the population biology of birds. Books like *The Natural Regulation of Animal Numbers and Population Studies of Birds* by David Lack, have witnessed the catastrophic impacts on the bird's population due to the changes in global climate. Climate change like prolonged droughts, unseasonal rains and unusual fluctuations in chills and heat waves, can alter the metabolic rate as well as the breeding success rate (i.e. low survival rate of young ones, egg size, nesting success) of resident and migratory birds.

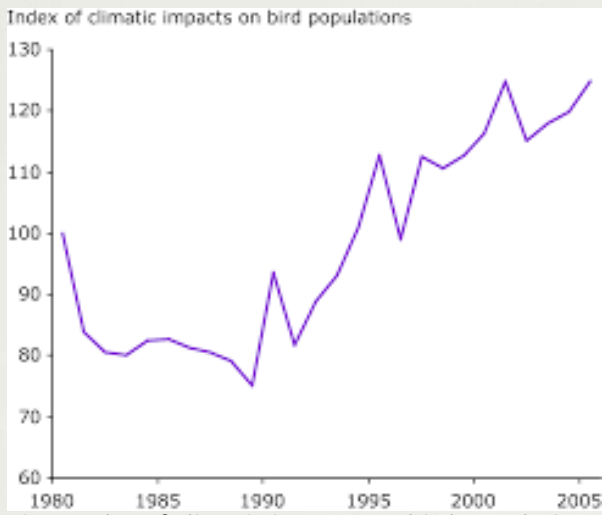
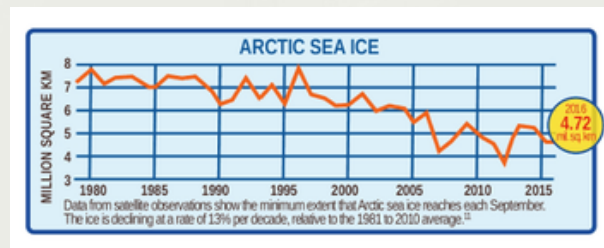


Fig 1: Index of climatic impacts on bird populations

## 2) Impacts on animals-

The very recent report reveals that the animal productions experience average declination over 69% since 1970. Many leading scientists even came to a conclusion that we are living through the sixth mass extinction, i.e. the period with largest loss of life after the dinosaur extinction era. The direct impact of climate change on animal is due to the increase in temperature and intensity of heat waves. The negative impacts of heat stress disturbs the metabolic as well as the oxidative activities in the animals, which ultimately cause metabolic alterations, oxidative stress, immune suppression, and death. Heat stress can cause metabolic disorders, for example, lameness in dairy and beef cows due to ruminal acidosis. Oxidative stress due to high temperature is also a major concern among animals. It is a result of disparity between oxidant and antioxidant molecules (i.e. surplus of oxidative molecules and lack of antioxidant molecule). Extreme weather conditions also



lead to heat exhaustion and heat syncope, which ultimately kills the animals.

## Conclusion-

Significant amount of studies and researches show that climate change not only has negative impacts on biomes but it also decreases their population rate, disturbing the complete ecosystem. Even a slight unusual rise in temperature can create severe problems among the wildlife. Therefore, techniques and tools for the surveillance of impacts of change in global climate on fauna, is needed, with immediate attention and action.

## References-

- 1) Nicola Lacetera- Impact of climate change on animal health and welfare. Animal Frontiers, Volume 9, Issue 1, January 2019, Pages 26–31.
- 2) IBIS International journal of avian science-volume 146, Issue s1, September 2004, Pages 48-56.
- 3) Fig 1: Impact of climate change on bird population- European Environment Agency.
- 4) Fig 2: Animals affected by Climate Change- The Global Education Project.

# WARMING IS WARNING



Name- Kirti Tyagi  
Branch- Biotechnology  
Year- 2nd(2021-25)

We human since early always try to make our life more luxurious and comfortable. we invent new technology to harness natural resources for our benefits. In this pursuit we reached a point where nature self healing process is disrupted. Are extreme exploitation has lead to serve consequences and one of the effect I'm going to talk about is "GLOBAL WARMING AND INCREASING SEA LEVEL". As we all hear in our daily news channel and newspaper that the level of sea is increasing and ice sheets are melting away .

What are these news all about ? What are the reasons behind it? Increasing of the sea level is a part of global warming and we can say one of the consequence we are facing because of global warming. "Green House Effect" is a word we should know if we are going to talk about global warming. Green house effect happens when the sun rays heat is reflected off the surface and can't escape back into the space from atmosphere.

This effect contains Carbon Dioxide, Chloro flurocarbon ,Water vapour, Nitrogen Dioxide and Methane . And is these components got excess in the atmosphere, it will cause global warming and because of this temperature is rising.

Have ever wonder why the people living in coastal areas are moving away ? Or the waves height of sea is slowly increasing? What if all the glaciers melt, then what will happen?

**THINGS HAPPENING AROUND US FROM WHERE IT START?**

Today's study shows us that about in 1950s, the rising of temperature

It's the scientific measuring that the long arc of data over time that the 2016 researchers reached this conclusion about when global warming became an issue.

**HOW DOES SEA LEVEL INCREASING HAPPENS?**

Several ways that are associated with global warming: **THERMAL EXPANSION** As we know that when we heated up the water ,it melt or change it's states.

**ANTARTICA'S ICE SHEETS** Ice sheet that cover almost cover the Greenland and Antarctica , as the heat increase their it causes the ice to melt .The ice sheets that presents on Greenland's is effectively lubricate which cause them to move more quickly into sea .  
**MELTING GLACIERS** Every summer little bit of ice melts away naturally . but recently though , persistently higher temperature caused by global warming have led to greater than average summer melting .This cause imbalance between ocean evaporation and runoff ,which cause raising level of sea's.

### CONSEQUENCES

If the seas level rise rapidly as they have been , even a small amount of change in nature can cause downfall like HURRICANES and TYPHOONS . Rising of sea level makes storms surge flooding during hurricanes more dangerously . if temperature keep increasing that the destruction of hurricanes and typhoons will be intense and potentially destructive.

### WHY SEA LEVEL MATTERS?

It matters because it pose a serious problem to our life. Because of this it cause destructive erosion ,

aquifer and agricultural soil contamination with salt, wetland flooding. Increasing of level means increase in difficulties .

however, it is an issue that must be carefully monitored so coastal area can be prepared for the consequences .

### CONCLUSION

Sea level rise is an increase in level of ocean's water due to the effect of the global warming. To stop this we have to several action in our daily life , so that we can see our future in construction not in destruction.

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1. Baede, A.P.M. (ed) (2007) Annex I glossary. In Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (eds. Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignor, M. and Miller, H.L.).
2. Cambridge University Press, Cambridge, pp. 941-954. [Google Scholar].  
<https://www.ipcc.ch/srocc/chapter/chapter-4-sea-level-rise-and-implications-for-low-lying-islands-coasts-and-communities/>



VOX-GLOBAL WARMING, EXPLAINED



# CLIMATE CHANGE



Name- Modeep Parashar  
Branch- Biotechnology  
Year- 2nd(2021-25)

My birthday falls in mid of April and it used to be a pleasant weather that time neither too much hot nor too cold but from past few years I realized that weather has changed a lot since then. It has now become more hotter nowadays. I started to study about it and found out some facts and information about climate change and global warming which I am going to share with you in this article.

Climate change refers to long term shifts in temperature and weather patterns due to variations in solar cycle and other reasons. Since 1800s Industrialization and other human activities caused climate change at a very high rate, primarily due to intensive use of fossil fuels i.e. coal ,oil ,gases, deforestation , improper agriculture waste management etc, are increasingly influencing climate change.

Limited planet resources cannot support unlimited exponential growth .Even renewable resources will depleted if they cannot be reviewed fast.

## Role of Industrialization in climate change

Global warming gradually increased because of green house gases like carbon-dioxide , methane , nitrous oxide, hydrofluorocarbons (HFC's) etc.CO2 concentration have increased from 278 ppm in 1960 to 414ppm in 2021 which is a 48% increase as shown in the figure 2 given below

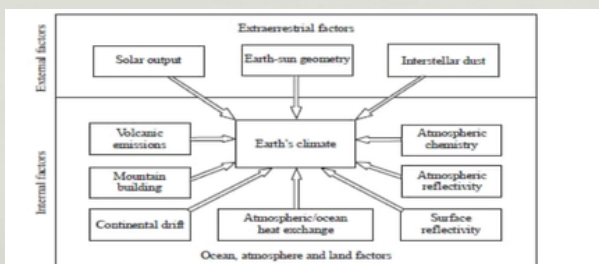
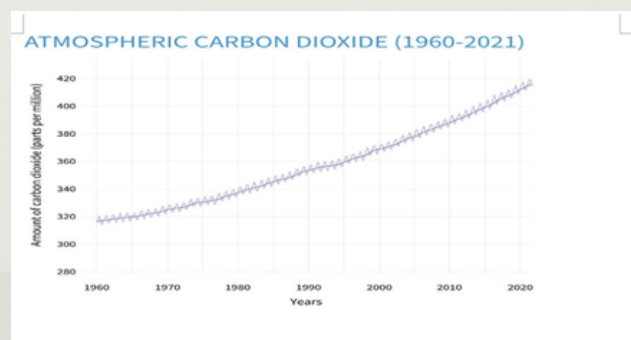


Figure 1: Factors responsible for Earth's climate change (Curtsey: British council)

Water vapours has an important indirect role in increasing temperature resulting from increasing GHG (Green House Gases)

concentrations. Increased global temperature resulting from GHG's increases the capacity of atmosphere to hold water vapour, thus act as a positive feedback, as water vapour, and also produce a greenhouse effect. An increase in global temperature by 1°C results in approximately a 7% increase in atmospheric water vapour. Therefore, CO<sub>2</sub> is the main anthropogenic control knob on climate.

### **Role of Deforestation in Climate change**

It is the purposeful clearing of forested land. Throughout history and into modern times, forests are razed to obtain wood, agriculture, construction, animal grazing etc. According to the reports of Intergovernmental panel on climate change, deforestation is a second main cause of climate change. Deforestation mainly in tropical areas, could account for one- third of total anthropogenic carbon dioxide emissions but recent studies tells that it contribute upto 12% of total anthropogenic CO<sub>2</sub> emissions.

### **Impact of Climate change on Environment and Human health**

Climate change involves a variety of potential environmental, social, and economic impacts on humans. In most of the situations, these impacts will be adverse like rising sea level, drought, floods while in a few isolated

situations, these could be more favourable such as increase crop yield. Canada has already become warmer by 2°C an average from 1950 to 2010. Climate change is expected to make extreme weather change events, such as heat waves, acute rainfall, floods, droughts and forest fire, more frequent and/or more severe in Canada. According to WHO this climate change causes various types of human disease such as skin cancer, hormonal imbalance, serve type of allergy, premature death mental retardation .

### **INTERNATIONAL EFFORTS TO FIGHT CLIMATE CHANGE**

- In order to enhance our knowledge about climate, first International Climate Program, World Metrological Organization (WRCP) was established in 1980 to boost the Climate Science.
- In 1988, UN set up the Intergovernmental panel on climate change (ipcc) to prepare and reports that provide a clear up-to-date picture of the scientific knowledge relating publish to climate change.
- This International emissions reduction agreement was proposed on 11/December /1997 In 1992, Rio De Janerio Earth Summit was organised by 197 countries of the world to discuss and acknowledge the role of Humanity in global warming

- 2005-Launch Of European Union Emissions Trading System the companies are granted a certain number of " emission allowance"
- DECEMBER 2009 -Copenhagen Climate change Conference Participants were unable to reach a binding agreement on GHG's .
- DECEMBER 2015 - PARIS AGREEMENT It is an agreement among leaders of 180 nations to reduce GHG's emission and limit below 2<sup>o</sup>c
- December 2019 EUROPEAN GREEN DEAL it is a set of policy initiative by European commission with aim of making European Union climate neutral in 2050

## CONCLUSION

Climate change is very harmful to us as it rises the temperature of earth which affects not only human but other species as well there are many alternative solutions for this problem such as efficient use of land ,reforestation , conservation of non renewable resources . As a responsible human we can also give our contribution

in this by using less plastic material ,car pooling use cycle instead of motorbike for short distance etc .

We as academic people should take the responsibility of making our environment fit for the

survival of not only humans but also for plant, animals, and microbes.

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1. Abbasi, Daniel R. (2005) Americans and climate change, a summary of insights and recommendation from 2005 Yale university forestry and environmental science conference on climate change .
2. Batagoda, DR. B.M.S. NATIONAL CARBON FINANCE STRATEGY OF SRI LANKA . Ministry of environment ,2006
3. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>
4. [https://en.wikipedia.org/wiki/climate\\_change](https://en.wikipedia.org/wiki/climate_change)

# THE BURNING OF PARALI



Name- Aishwarya Pandey  
Branch- Biotechnology  
Year- 2nd(2021-25)

Before we begin let us first go and see the situation of last few years winter. Waking up from your bed in the month of November, you come out of your room in your balcony and notice the entire city covered in a thick grey colored blanket called smog. You aren't curious here as you are well aware that what it is, yes you guessed it right it is Parali (stubble burning). Parali burning is the biggest contributor of pollution in the north - western state. The people of India were well aware of mask even before the arrival of coronavirus, The impact of Parali burning was such that kids and old age people were advised to stay indoors.

**Now what is this "PARALI" and why is it so problematic ?**

So, to understand this we need to know that India is the biggest cultivator of rice and wheat. Almost 130.29 Mt of rice and 106.84 Mt of wheat was produced in the year 2021, so its natural to have the generation of a large amount of residue (stubble ) and this problem mainly arises in the north-western states of India like Haryana ,Punjab , Delhi, etc. In the year 2021 , it was reported that there was a generation of 83Mt



(23.8%) of stubble so to dispose it of the farmers use the conventional way of burning it .This burning of Parali generates a lot of harmful gases such as carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and methane (CH<sub>4</sub>) as well as particulate matters (PM<sub>10</sub> and PM<sub>2.5</sub>) . During the month of October to December the AIQ (air index quality) rises above 280 in the northern states of India. Now to keep this under control the government of India has made certain laws, on December 10, 2015, the National Green Tribunal (NGT) had banned crop residue burning in the states of Rajasthan, Uttar Pradesh, Haryana and Punjab. Burning crop residue is a crime under Section 188 of the IPC and under the Air and Pollution Control Act of 1981. However, we cannot see the impact of the law and hence government's implementation lacks strength.

During the month of October to December the AQI (air index quality) rises above 280 in the northern states of India. Now to keep this under control the government of India has made certain laws, on December 10, 2015, the National Green Tribunal (NGT) had banned crop residue burning in the states of Rajasthan, Uttar Pradesh, Haryana and Punjab. Burning crop residue is a crime under Section 188 of the IPC and under the Air and Pollution Control Act of 1981. However, we cannot see the impact of the law and hence government's implementation lacks strength.

The generation of pollution from Parali burning has made the people of north-western vulnerable especially children and old age

Following are the health hazards of Parali burning:

- 1) eye irritation
- 2) dryness of eyes
- 3) chest congestion
- 4) It also leads to chronic obstructive pulmonary disease (COPD)
- 5) pneumoconiosis
- 6) pulmonary tuberculosis
- 7) bronchitis
- 8) cataract
- 9) corneal opacity
- 10) blindness



It has also been seen that burning of Parali has led to an increase of accidents due to poor visibility on roads. The effect of burning is not just affecting humans, but it also contributes to haze, greenhouse effect and environmental changes.

So if we continue the use of conventional method of residue handling then we will be killing ourselves, hence we need to find a solution and implement these alternative solutions for this. One suitable way of reducing this problem is to incorporate the residual straw in the soil, not only this solve the problem but also enhances soils properties. The residue materials can also be used in organic farming as compost which not only enhances soil properties but also enhances nutrition.

This residue contains biomass which can be use to generate biomass energy. Also the government must impose strict laws for defaulters and should organize campaigns for its awareness. Further, in the previous years, many different processes have been developed to produce alternate biofuels under different forms (pellets, briquettes) from crop residues. A smart and sustainable way is the need of the hour to handle this critical anthropogenic situation

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# GLOBAL WARMING AND CLIMATE CHANGE

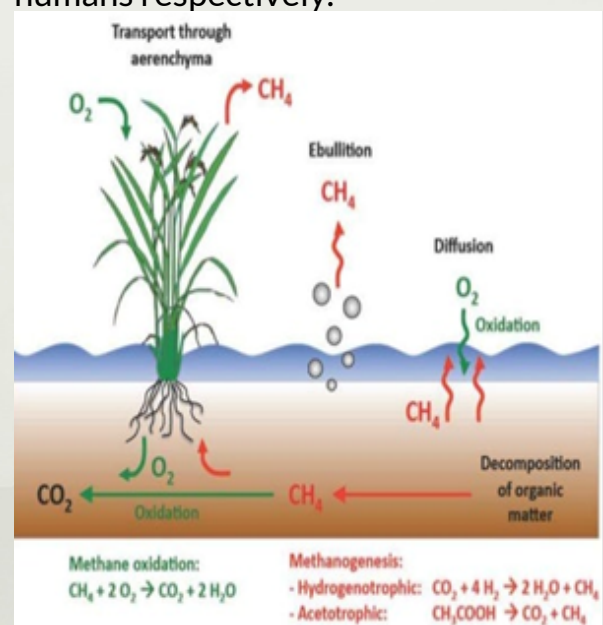


Name- Harshit Sharma  
Branch- Biotechnology  
Year- 3rd(2020-24)

“There are enough resources for everyone’s need but not for anybody’s greed” said Mahatma Gandhi Nature is concentrated with millions of living species around the globe. As nature is growing, it is giving birth to new species. The crude oil and its product which are excessively used in our daily routine are provided by the mother nature. We must understand there is nothing in the world as worthy as nature. No artificial intelligence or a human-invented machine can ever provide what nature has given free of cost. Any non-living can do nothing without the influence of nature. There is no use of a fan where there is no air.

Nature has helped millions of writers to weave their poetry by influencing the way we see or feel something. We should always keep our nature clean and beautiful./ Over the last few decades, planet Earth has heated up a lot. This is called the phenomena of global warming, which means the warming up of the globe , i.e., Earth. Since we now live in the age of development and capitalism

, there are factories all over the world that emit harmful fumes. These fumes are an example of the kind of substances that create the holes in the Ozone layer. The main reason of ozone is production of CFCs (chlorofluorocarbons) which has increased the cancer cases among humans respectively.



These holes allow in harmful UV rays and heat the planet. There are several reasons for global warming and climate change. The primary reason for global warming and climate change is the greenhouse effect.

The greenhouse effect refers to the entrapment of heat by greenhouse gases, such as carbon dioxide, nitrous oxide, etc. between the Ozone layer and the surface of the Earth, creating more and more heat as it remain trapped. This causes the temperature on the Earth to rise increasingly.

Many people think of global warming and climate change as synonyms, but scientists prefer to use “climate change” when describing the complex shifts now affecting

our planet’s weather and climate systems. Climate change is not only rising average temperatures but also extreme weather events, shifting wildlife populations and habitats, rising seas, and a range of other impacts .Scientists already have documented these impacts of climate change: Ice is melting worldwide, especially at the Earth’s poles. Global sea levels are rising 0.13 inches (3.2 millimeters) a year. The rise is occurring at a faster rate in recent years and is predicted to accelerate in the coming decades. Rising temperatures are affecting wildlife and their habitats. Vanishing ice has challenged species such as the Adélie penguin in Antarctica, where some populations on the western peninsula have collapsed by 90 percent or more.

As temperatures change, many species are on the move. Some butterflies, foxes, plants have migrated from hotter to cooler areas. Precipitation (rain and snowfall) has increased across all the parts of world on an average.

Yet some regions are experiencing more severe consequences, increasing the risk of forestfire and drinking water shortages. Some species—including mosquitoes, ticks, jellyfish, and crop pests—are thriving. Booming populations of bark beetles that feed on spruce and pine trees, for example, have devastated millions of forested acres in the U.S. Many species have been endangered and many has been extinct due to the global warming respectively.

Last but not the least we should work our level best to save our precious environment and protect our mother earth. Source: Global warming and climate change effects: information and facts (nationalgeographic.com)

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# REFORESTATION USING DRONES AND CONVERSION OF METHANE INTO PROTEIN



Name- Cynthia Swarup  
Branch- Biotechnology  
Year- 2nd(2021-25)

Afforestation and reforestation using drones can help limit climate change and global warming in a short time as a rapid reforesting response is urgently required

## **.Why use drones?**

The drones are capable of doing field and soil analysis in a short time. The drone can detect what areas of the land are dry, ensuring an even hydration of the crops.

The plantation operation uses heavy-lift payload drones that can carry a considerable payload of completely prepared encapsulated seeds. These specially designed seed pods include pre-germinated seed, nutritious hydrogel, an initial nutrient package to assist early growth, and fertilizing matter giving it all the minerals and moisture it needs to get started.

“The world has 10 years remaining to prevent a massive and destabilizing climate change through combined rapid phase-out of fossil fuels, reforestation, and other natural climate solutions.”

---UNITED NATIONS INTER GOVERNMENT PANEL ON CLIMATE CHANGE.

## ***How do drones help to restore cleared forests?***

Lost forests can be revived using drones. New planting systems consist of a mapping unmanned aerial vehicle (UAV), advanced cameras, artificial intelligence (AI), machine learning software, and RADAR imaging to select ideal sites for seeding. The technique is fully automated and promises to be a significantly cheaper and faster means of reforestation. Also, the precision of UAVs saves an ample amount of time.





Pods or encapsulated seeds containing pre-germinated seeds are then fired into the ground soil by the drone, enabling the plantation of a large number of trees in a short period of time.

### Advantages of using drones

In addition to speed and cost, the new techniques offer several other advantages. Mapping technology is used to increase uptake rates and the likelihood of a healthy forest department.

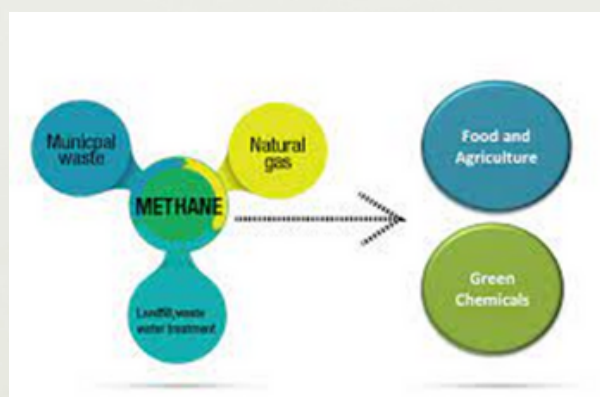
This technology is 25 times faster than the conventional tree-planting technique which includes volunteers, and difficult labour.

At the UN climate summit in Paris, a commitment was made to restore 350 million hectares of degraded and deforested land by 2030; it is clear that traditional planting techniques will not be enough.



### Converting methane into protein rich biomass

Methane is the second most important greenhouse gas (GHG). It is more potent than CO<sub>2</sub> because it has much higher heat trapping ability. It is responsible for roughly 30% of the global warming since pre-industrial times. It has more than 80 times the warming power of CO<sub>2</sub> over the first 20 years after it reaches the atmosphere. Solution lies in CH<sub>4</sub>-consuming bacteria called methanotrophs which grows at low temperature in presence of water, oxygen, methane and nutrients inside a bioreactor resulting in protein rich biomass which can act as the global source of protein.



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# THE COVID-19 CRISIS AND ITS CONSEQUENCES FOR GLOBAL WARMING AND CLIMATE CHANGE



Name- Faiza Nasir  
Branch- Biotechnology  
Year- 2nd(2021-25)

## INTRODUCTION:

India is highly affected from climatic changes but COVID-19 had a positive impact on the environment.

During the coronavirus pandemic, the world experienced a great change in their regular life patterns. The government had suspended many activities so that the disease does not spread and people could stay safe.

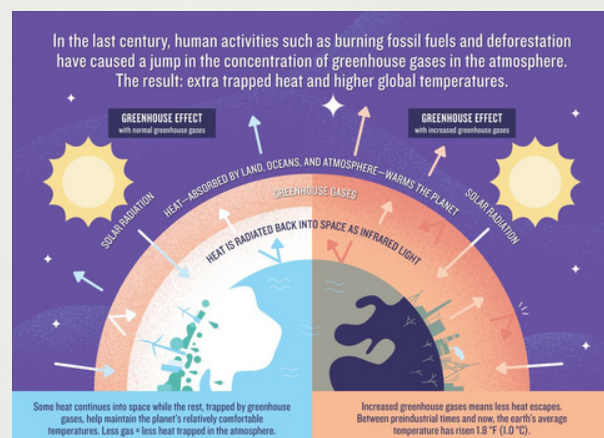
The decline in the consumption of the petroleum and fossil fuels has led to a decline in greenhouse gas emissions, something that people never witnessed before the pandemic. It also led in the deceleration in the global warming.

In first four months of 2020, global daily emission of CO<sub>2</sub> from transport, power and industry had declined at an enormous rate.

Global warming is an outcome of increasing concentration of CO<sub>2</sub> and many other toxic gases.

## Reduction of Air Pollution and Greenhouse gases:

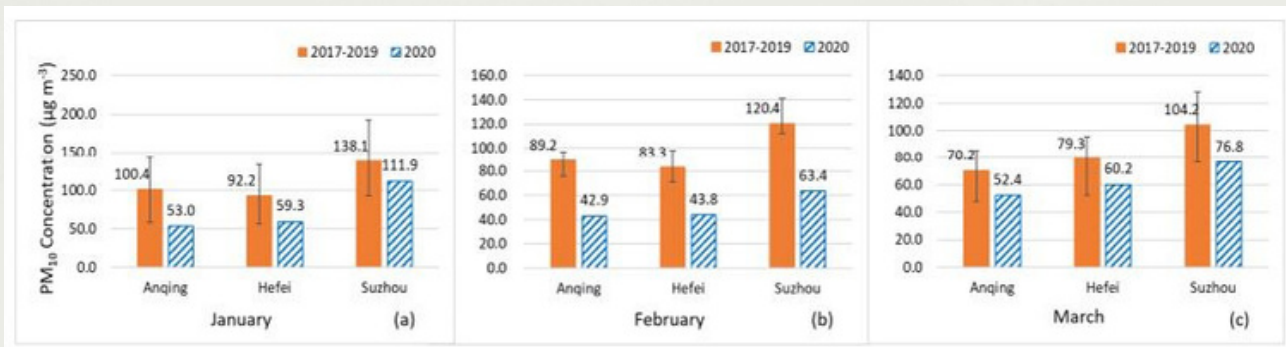
The contamination in air caused due to the emissions from engines, factories, vehicles etc. Is the major



RESOURCE Greenhouse Effect 101 | NRDC

cause of air pollution. Rising levels of air pollution is a huge reason of increasing number of allergies, respiratory diseases, cardiac diseases and many other serious issues among the living beings. 7 million people are killed annually because of air pollution.

Gases such as carbon-dioxide, nitrogen-dioxide, methane, ozone, nitrogen oxide, etc. are the contributors of air pollution which lead to global warming. During the COVID-19 pandemic, the world experienced a decline in the levels of these harmful gases.



RESOURCE: [HTTPS://WWW.BING.COM](https://www.bing.com)

In China, the citywide quarantine led to the highest decline in the concentration of the pollutants, which began from Wuhan and spread to other cities. The decline in air pollution during the pandemic helped diminish slow climate change.

A study indicated, in India, the levels of harmful greenhouse gases declined as compared to pre lockdown levels.

The reduction in toxic gases which caused global warming was a positive impact of coronavirus pandemic which reduced the risk of diseases.



RESOURCE: air pollution - Bing

### Reduction of carbon emissions:

The Keeling Curve is the graph which shows the concentration of carbon-dioxide in the atmosphere. It shows that the level of carbon-dioxide levels in the atmosphere is increasing continuously since last 61 years.

But due to COVID-19 pandemic, the reduction in CO<sub>2</sub>

measurements by 10% has been manifested. Forests play the most important role in reduction of CO<sub>2</sub> in the environment. Air travel is responsible for 5.2% and 2.5% of the green house gas emissions as most of the oil demand comes from the aviation industry. The total number of flights per day were reduced to only one-fourth to prevent COVID-19 pandemic, and it decreased the emission of CO<sub>2</sub> by 31%

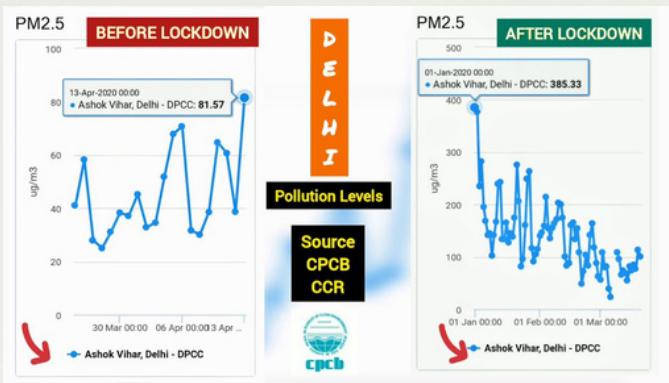
The International Energy Agency estimates that the coronavirus crisis's shock will reduce the total global oil consumption by 2020.

The COVID-19 crisis had a severe effect on the oil market. This was more apparent in China.

### Reduction of noise pollution:

Noise pollution is a big issue in cities and is becoming a global problem. It damages the human body and its functions and has adverse psychological effects.

The two most important sources of noise pollution are industries and transportation.



RESOURCE: [HTTPS://WWW.BING.COM](https://www.bing.com)

## CONCLUSION:

Global challenges do not have National Borders. People think that global warming and climatic changes are not a subject of their concern but it is each and every individual's responsibility to take care of the nature. Everyone should behave as a responsible person and

take measures for controlling the climate change and emissions of harmful gases which lead to global warming.

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# "GLOBAL WARMING -THE MANMADE DEVIL"



Name- Kingshuk Bhatnagar  
Branch- Biotechnology  
Year- 2nd(2021-25)

For a subtle Abstract-

The only civilized and yet most intellectual species to thrive on mother earth is the human race. Known to be selfish in terms of development and easy lifestyle, it justified its actions against nature by certain survival theories and hypothetical rules such as natural selection and evolution by Charles Darwin.

Regarded as justifiable by mankind these theories to counter allegations on their bad deeds towards environment, may save them from another day in court but it won't save'em from a devil whose foundation the homo sapiens themselves laid. Yes! I'm talking about the elephant in the room, or shall it be a void that'll bestow upon humankind soon enough. This article is about The Global Warming.

To start with it, considering the smoky day to day weather that's not novel to this generation, all the particulate matter suspended in the air that we inhale and is now embedding in our biological systems as we breath keeps

reminding oneself of nothing less than global warming. I'm sure this is no new domain for my fellow readers but still to provide with a rough idea about it, imagine earth being a big planetary oven heated up to its limit. Well, what's inside this unique oven, of course it's us and all other organisms that reside over the planet earth. Do you think life can survive that tremendous heat? No surely not. That's a possible fate we earth dwellers might share in future.

All the gases included in the section referred to as greenhouse gas that get produced in due cause of our daily Livelihood get accumulated in atmosphere and trap all the harmful radiations of the sun not letting them escape which are actually to be deflected back by earth to sustain life. This is the sole process defined as Global Warming.

Although certain levels of these gases are crucial to maintain quality temperature but as we know it, excess of everything is injurious. Hence, gases such as carbon dioxide, nitrous oxide, methane, HCFCs, HFCs and others produced by various machinery operations, automobiles,

thermal electricity generation, and burning of fossil fuels etc. Are responsible for global warming.

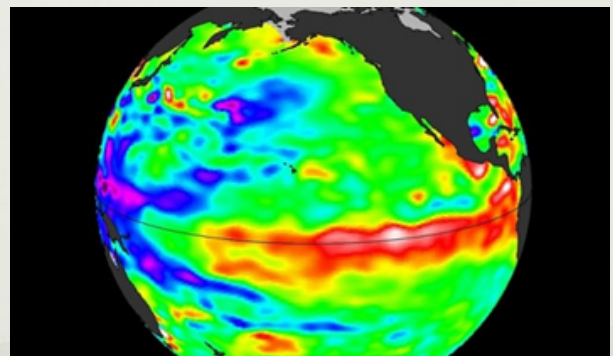


Some of us, even people at higher authority like US President may deny the fact that global warming exists and quote them as "hoax or cons". Yes, shedding some light here over the Trump's "Climate scandal". This doesn't shake the fact that climate is actually changing. Freezing storms somewhere on earth doesn't point to the fact that glaciers aren't melting, temperatures aren't rising, and heat isn't increasing to manifolds and numerous other problems because of it. A distortion in earth's atmospheric cycle is causing erratic weathers at places least expected to be. Delaying of winters and scorching summers in North India if we talk about familiar places with most pleasant climates is a major proof to the fact that global warming exists and false claims even by powerful people doesn't seem to shake this belief as we get to see extreme changes in climate in the near future if we not handle this situation cautiously. This may sound like a small transition, but let me affirm that

even this much increment is a drastic change on global level. Warmer summers and

nearly no winters or no cold weather is a result of this phenomena. Regions lying between equator and the two tropics (Cancer and Capricorn) used to showcase most pleasurable climates but in recent research it is found that these seven years that went by have been the warmest years ever recorded in history. From 2015-20 these years have made us experience warmest summers and the heating of ocean surfaces.

research it is found that these seven years that went by have been the warmest years ever recorded in history. From 2015-20 these years have made us experience warmest summers and the heating of ocean surfaces.



An event known as El Nino was recorded in year 2016. The frequency of its occurrence was severely affected by global warming. We have already lost the pleasant summers to the so-called global warming, but they may be reacquired if we

put a control on greenhouse gas emissions, otherwise we may never get'em back. High temperatures recorded by infrared satellite imaging and UV scopes inform scientists that glaciers and poles of earth are rapidly melting causing rise in the sea level.

According to them "Between 1901 to 2018, the globally averaged sea level rose by 15-20 CM Or 1-2 mm if averaged per annum. And this rate is accelerating with the sea levels now rising by 3.7 mm per year".

This immense acceleration in the rate of rising sea level will cause drastic developments to the world topography. It will cause decrease in lithosphere and proportionally increase the hydrosphere of earth. Future of many of the landmarks are in peril as the oceans are pushing back settlements because the sea levels are rising. Places like: -

- Venice, Italy
- Honolulu, Hawaii
- Easter Island, Chile
- Miami, Florida
- Maldives
- Eifel, Germany

And many other cities falling under the danger zone will be underwater by 2050. Including some cities of India like: -

- Mumbai
- Kochi
- Mangalore
- Vishakhapatnam

And basically, all coastal cities and countries are at risk due to climate change caused by global warming.

Also, high temperatures are causing severe transitions in climate of tundra regions and hazardously damaging the permafrost layer of Arctic and Antarctic.



Affecting flora and fauna tremendously the species like polar bear and emperor penguins have nowhere to be and their hunting and fishing grounds are rapidly decreasing in terms of area. If not considered their situation will worsen and this will surely lead to extinction of these species to be. Just think, not for yourself but what about the generations to come. They will be born into a world without these gorgeous creatures. Who will they accuse!?! Of course, this so-called generation Z will be red handed

'How long do we think we have on this planet?' With respect to the current situation of climate change and still nearly no strict action to combat global warming.

Well scientists have suggested that "With the current rate of greenhouse gas production, that is so high. The Earth has about 11 years to rein in emissions". Yes, that's how long we have if the problems are not considered. If the people disbelieving in the phenomenon called 'The Global Warming' are not silenced for their scrutiny against nature. Every time humanity has meddled with the forces of nature, it has backlashed so hard. Loss of millions of lives and billions worth property. And it doesn't stop there, it has permanent effects which are observed years after and cause lethal problems for next generations.

A new study shows that 'With no change in emissions by 2050, 1,126,000 premature mortalities are expected each year'

**Can we stop this!?**

Well not immediately of course but



yeah as we know even the oceans were made drop by drop. Similarly, even if the studies show that contribution of humanity in recovery of planet earth may be 20-30, or in certain cases even up to 50% still it is a large hand we can include in a drive to heal our own planet and make it much hospitable than presently it is.

As for countering Global Warming, that can be achieved by numerous operations in literally several grounds.

Such as less fossil fuelled vehicles on road can be done by carpooling or public transportation. Even better solution is to switch to eco-friendly fuels like electric vehicles, hydro or lithium battery vehicles etc.

Also, switching to hydro and solar power in order of generation of electricity. Thermal power plants have low efficiency produces and cause more pollution comparatively. Whereas solar power plants are one-time investments that provide with high energy outputs and have ideally high efficiency. Whereas hydroelectric power generation uses potential energy of water, and this causes no harmful gases in air.

Condensers and precipitators installed in the chimneys of factories and industries, and exhausts of refrigerators and air conditioners also



controls the concentration of harmful gaseous contents in atmosphere and chemically change the greenhouse gases produced to lesser effective forms of compounds.

Use of LEDs in place of bulbs inbuilt with gases can also help in controlling greenhouse gas production and use of scents rather than deodorant also counters global warming to some extent.

Controlled or lessened use of plastics in packaging and other utilities can affect the produce of greenhouse gas too.

And if nothing, you can always take initiative by planting trees in your area.

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# TEST YOURSELF

**1. Which one of the following cause global warming?**

- a) Carbon dioxide
- b) Oxygen
- c) Nitrogen
- d) Hydrogen

**2. Who measures the global warming rate?**

- a) Astrologers
- b) Physicist
- c) Philosopher
- d) Climatologist

**3. Which one of the following result takes place due to global warming?**

- a) Maintaining steady temperature
- b) Changes in the rainfall
- c) Pleasant environment
- d) Causing less pollution

**4. Which one of the following cause global warming?**

- a) Radiative forcing
- b) Earth gravitation force
- c) Oxygen
- d) Centripetal force

# TEST YOURSELF

**5. Which one of the following land use causes global warming?**

- a) Increase in the fertility of soil
- b) Surface reflectance
- c) Forestation
- d) Adopting organic farming

**6. What is the main reason for melting of ice sheets?**

- a) Increase in the oxygen content
- b) Global warming
- c) Decrease in carbon dioxide content
- d) Noise pollution

**7. Which one of the following is the effect of global warming?**

- a) Maintaining sea level
- b) Proper rainfall
- c) Desertification
- d) Afforestation

**8. How many percent of carbon dioxide increased in the atmosphere since pre-industrial times?**

- a) About 10%
- b) About 20%
- c) About 30%
- d) About 40%

# TEST YOURSELF

**9. Which one of the following is the anthropogenic radiative forcing of climate?**

- a) Aerosols
- b) Cement
- c) Paper
- d) Glass

**10. Changes in the composition of the atmosphere is an example of \_\_\_\_\_**

- a) Internal forcing
- b) External forcing
- c) Mid forcing
- d) Gravitational forcing

**11. Which country meets the 90% of its need from Geothermal and Hydro energy?**

- a) Iceland
- b) Antarctica
- c) Australia
- d) Germany

**12. Which activities are the largest contributors of greenhouse gases?**

- a) Deforestation
- b) Electricity generation
- c) Industry
- d) Transportation

# ACTIVITIES OF BIOTECHNOLOGY DEPARTMENT

## REGIONAL CENTRE OF BIOTECHNOLOGY

Department of Biotechnology organised a research and entrepreneurship visit to Regional Centre for Biotechnology (RCB) Faridabad for B.Tech Biotechnology 4th year students on November 21, 2022. Dr. Santosh Kumar Mishra, HoD-BT accompanied the students. RCB is an academic institution established by the Department of Biotechnology Govt of India with regional and global partnerships synergizing with the programmes of UNESCO as a Category I Centre. The primary focus of RCB is to provide world class education, training and conduct innovative research at the interface of multiple disciplines to create high quality human resource in disciplinary and interdisciplinary areas of biotechnology in a globally competitive research milieu. Students gained knowledge about the opportunities available to Tech technology students in the field of research and innovation. The visit proved to be highly informative and motivating for the students.

## MOTHER DAIRY

An industrial trip to the Mother Dairy head quarters at Patparganj Delhi was organised for the students of B.Tech Biotechnology one year on Oct 2022. Mr. Mohit Assistant Professor BT Department accompanied the students. Mother Dairy set up in 1974 known for its hygiene and good quality of mix and agro based products. Students gained knowledge about the processing and handling of milk and other dairy products. Students gained knowledge about various tests that could be conducted to check the purity of milk. All students were given refreshments in the form of flavoured milk and Ice Creams. It was a great learning-cum fun experience for the students.



# ACTIVITIES OF BIOTECHNOLOGY DEPARTMENT

## YAKULT

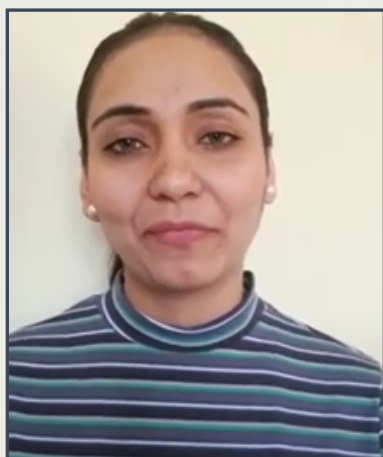
An industrial trip to Yakult Danone India (P) Ltd HSIIDC Industrial Area, Rai, Sonipat Haryana for 3rd & 4th year students of B Tech Biotechnology was organised on October 18 2022 Dr Vivek Kumar, Assistant Professor BT Department accompanied the students. The students were briefed about the company, genesis of Yakult importance of probiotic drinks, production process, marketing and distribution of the product via a power point presentation in the presentation room Students were shown the process of production and packaging of Yakult. The entire tour through the factory was extremely interactive, wherein students asked questions in the end the students were given Yakult as refreshment. All in all it was an informative and refreshing experience.

## PLANTATION DRIVE

Celebration of ayurveda day on 21st October 2022' Nature can do more than physicians'. The Cultural Committee of IMS Engineering College Ghaziabad organised a medicinal plant drive on the occasion of the Ayurveda day under the aegis of "Ayurveda @2047 -Azaadi ka Amrit Kaal Ms. Kanika Malik, Ms Dhanshri Parihar organized the event in which several medicinal plants like Ashwagandha, Amla, Heena, Periwinkle etc were planted in the Herbal Garden of BT department. Dr. Vikram Bali, (Director IMSEC), Dr.S.N Rajan (Dean Academics) and faculties from other departments participated in the event.



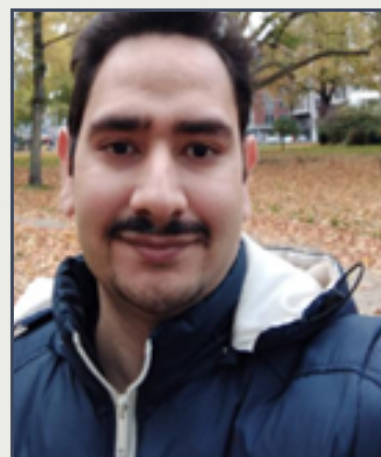
# OUR PROUD ALUMNI



Isha Gulati  
(Senior information security analyst, MAC Montreal Canada)



Sharib Khan  
(Junior Fellow at University of Life Sciences, Estonia)



Puneet Talwar  
(Postdoctoral Researcher GIGA – cyclotron center (University of Liege), Belgium)



Mr. Ankit Sharma  
(Senior Research Scientist, Sun Pharmaceutical Industries Limited, Delhi)



Ashutosh Johri  
(Digital Marketing Manager, LawzDrid)



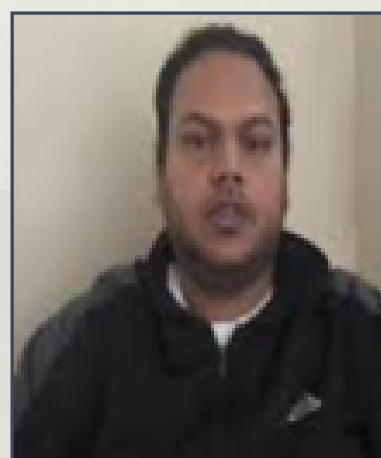
Dharmendra  
(Software architect, Ankaa Consulting)



Varun Arora  
(Entrepreneur-Owner)



Meenakshi Yadav  
(Assistant Controller of Patents and Design, Indian Patent Office, Govt. of INDIA)



Prateek Gupta  
(Sr. Validation & Compliance Manager, Regeneron Pharmaceuticals)



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