

# EARTH ROOT

Volume **33**  
FEBRUARY, 2024

LOOK DEEP INTO NATURE, AND THEN YOU  
WILL UNDERSTAND EVERYTHING BETTER.  
-ALBERT EINSTEIN



# About E-magazine

“Earth Root” is an open access e-magazine in the discipline of Environmental sciences published by Earth Root Foundation. The aim of the e-magazine is to provide information and upgradation of knowledge about environmental issues on wider scale and to share ideas and resources to the readers. Using essential knowledge people can lead a healthy life, which is more sustainable and can connect with ongoing efforts for stopping catastrophically the climate change. E-magazine caters to all related environmental aspects ranging from big issues like climate change, renewable energy and pollutants in the atmosphere to the health of human and living beings on Earth. We also take topics of water resources and efforts and measurement to provide optimum use of it; including large scale atmospheric circulation linked with oceans and ecology.

<b>Title -</b>	Earth Root
<b>Frequency -</b>	Monthly
<b>ISSN -</b>	2583-6013
<b>Publisher -</b>	Earth Root Foundation
<b>Chief Editor -</b>	Dr. Vivek Panwar
<b>Copyright -</b>	Earth Root Foundation
<b>Starting Year -</b>	2021
<b>Subject -</b>	Environment
<b>Language -</b>	English
<b>Publication Format -</b>	Online
<b>Phone No. -</b>	011 49064364
<b>Email ID -</b>	<a href="mailto:info@earthrootfoundation.org">info@earthrootfoundation.org</a> <a href="mailto:vivekpanwar@earthrootfoundation.org">vivekpanwar@earthrootfoundation.org</a>
<b>Mobile No. -</b>	+91 876631774 +91 99990013202
<b>Website -</b>	<a href="http://www.earthrootfoundation.org">www.earthrootfoundation.org</a>
<b>Address -</b>	456, pocket B, Sector -13 Dwarka, New Delhi -110078

# Editorial Board



## DR. VIVEK PANWAR

### Editor-in-Chief

Assistant Professor, Department of Physics, Sri Venkateshwara College, University of Delhi, Benito Juarez Marg, Dhaula Kuan, New Delhi, Delhi 110021, India

Email: [vivek@svc.ac.in](mailto:vivek@svc.ac.in)

Profile Link: [http://www.svc.ac.in/SVC\\_MAIN/Departments/FacultyPhysics/Vivek.php](http://www.svc.ac.in/SVC_MAIN/Departments/FacultyPhysics/Vivek.php)

## PROF. SURENDRA KUMAR DHAKA

### Editor

Professor, Department of Physics & Electronics,  
Rajdhani College, University of Delhi, Ring Road, Raja Garden, New  
Delhi – 110015, India

Email: [skdhaka@rajdhani.du.ac.in](mailto:skdhaka@rajdhani.du.ac.in)

Profile Link: <https://www.rajdhanicollege.ac.in/Base/faculty/159>



## DR. NARENDRA SINGH

### Editor

Aryabhata Research Institute of Observational Sciences (ARIES),  
Manora Peak, Nainital – 263001, Uttarakhand, India

Email: [narendra@aries.res.in](mailto:narendra@aries.res.in)

Profile Link: <https://www.aries.res.in/people/user-profile/sci/76>



## DR. DEEKSHA KATYAL

### Editor

Associate Professor, University School of Environment Management,  
Guru Gobind Singh Indraprastha University, Sec-16C, Dwarka, New  
Delhi – 110078, India

Email: [deekshakatyal@ipu.ac.in](mailto:deekshakatyal@ipu.ac.in)

Profile Link: [http://www.ipu.ac.in/usem/Associate\\_Professors.php](http://www.ipu.ac.in/usem/Associate_Professors.php)



## DR. PAWAN KUMAR

### Editor

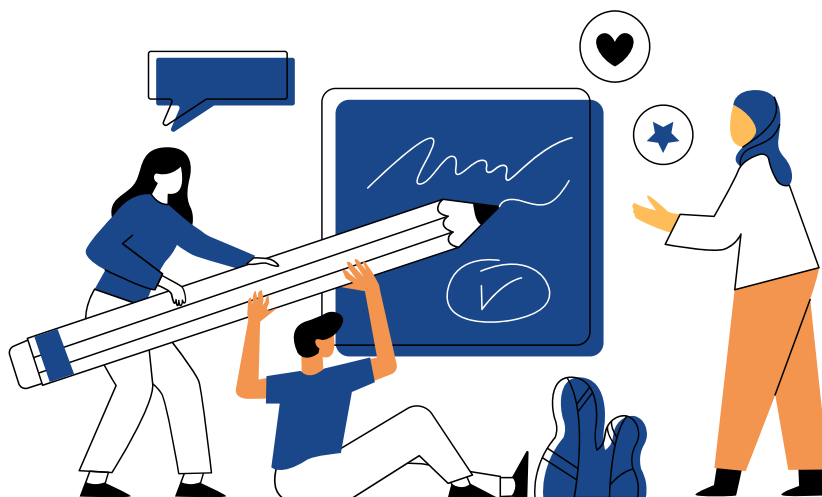
Assistant Professor, Department of Chemistry,  
Rajdhani College, University of Delhi, Ring Road, Raja Garden, New  
Delhi – 110015, India

Email: [drpkumar@rajdhani.du.ac.in](mailto:drpkumar@rajdhani.du.ac.in)

Profile Link: <https://www.rajdhanicollege.ac.in/Base/faculty/248>



# TABLE OF CONTENTS



PG. NO.

**04**

**SCARS OF THE PAST: DEVASTATING CLIMATE DISASTERS THAT SHAPED OUR WORLD ( KAMALDEEP )**

**08**

**EFFECTS OF POLLUTION ON BACTERIAL RESISTANCE ( ANUSHA )**

**10**

**HARNESSING THE POWER OF BIOCHAR: A SUSTAINABLE SOLUTION FOR AGRICULTURE AND CARBON SEQUESTRATION ( DR. VIVEK PANWAR )**

**12**

**CREATING A GREENER BODY: THE EFFECTS OF BODYBUILDING DIETS ON THE ENVIRONMENT AND SUSTAINABLE SOLUTIONS ( RAGHAV )**

**14**

**BOOK RECOMMENDATION**

**15**

**POEM**



# SCARS OF THE PAST: DEVASTATING CLIMATE DISASTERS THAT SHAPED OUR WORLD

Climate disasters have been a chilling reality throughout human history, leaving behind trails of destruction and shaping the course of civilizations. From scorching heatwaves to monstrous floods, these events have tested our resilience and forced us to adapt. Today, we delve into some of the most devastating climate disasters of the past, understanding their impact and the lessons they hold for the future. Some of these disasters are human-made, some are natural, and, in some cases, the several unprecedented events combining together created an unforgettable event that created a long-lasting impression on humanity.

## **1. The Great Famine of Ireland (1845-1852):**

Triggered by the eruption of Mount Tambora in Indonesia, the Irish potato blight of 1845 caused widespread crop failure. The ensuing famine devastated Ireland, leading to over 1 million deaths and mass emigration. This event stands as a stark reminder of the vulnerability of agricultural systems to extreme weather events.



Image source:-

[windowwww.britannica.com](http://windowwww.britannica.com)

## **2. The Dust Bowl (1930s):**

A decade of unsustainable farming practices and severe drought in the American Midwest led to the Dust Bowl of the 1930s. Dust storms ravaged entire communities, displacing millions and leaving behind a landscape of ecological devastation. This event highlighted the importance of sustainable land management and the dangers of environmental exploitation.



Image source:- [windowdrought.unl.edu](http://windowdrought.unl.edu)

### 3. The Galveston Hurricane of 1900:

One of the deadliest natural disasters in American history, the Galveston Hurricane of 1900 struck with a fury, claiming an estimated 8,000 to 12,000 lives. The city was virtually leveled, highlighting the need for improved infrastructure and disaster preparedness to mitigate the impact of such events.



Image source:- [windowwww.nps.gov](http://windowwww.nps.gov)

### 4. The Tangshan Earthquake of 1976:

The deadliest earthquake of the 20th century, the Tangshan earthquake of 1976 struck China with a magnitude of 7.8, killing an estimated 655,000 people. The disaster exposed the vulnerability of poorly constructed buildings and the importance of earthquake-resistant infrastructure.

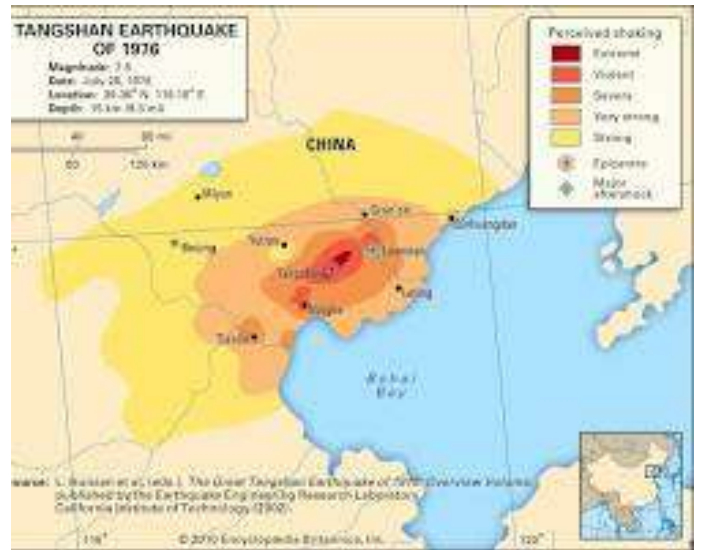


Image source:- [windowwww.britannica.com](http://windowwww.britannica.com)

### 5. The Bhopal Gas Tragedy (1984):

While not directly a climate disaster, the Bhopal gas tragedy serves as a chilling reminder of the environmental consequences of industrial activity. A leak of methyl isocyanate gas from a Union Carbide pesticide plant in India resulted in the deaths of over 15,000 people and countless lasting health complications. This event underscored the need for stringent environmental regulations and corporate accountability.



Image source:- [wikipedia.org](http://wikipedia.org)

## 6. The Chernobyl Disaster: A Nuclear Shadow on History (1986)

Alongside the devastating natural disasters that have shaped our world, we must also remember the Chernobyl nuclear disaster of 1986. While not directly caused by climate change, it stands as a stark reminder of the environmental and human consequences of technological miscalculations in the face of immense power.

On April 26, 1986, a series of safety violations and flawed reactor design led to the explosion of the No. 4 reactor at the Chernobyl Nuclear Power Plant in Ukraine. The resulting inferno spewed radioactive materials into the atmosphere, contaminating vast swathes of Europe and impacting millions of lives.

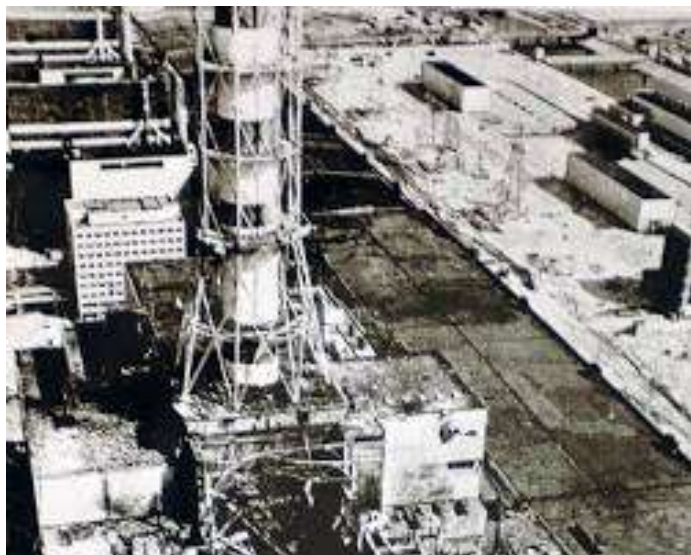


Image source:- wikipedia.org.

### Immediate Devastation and Long-Term Scars:

The immediate death toll from the explosion and acute radiation sickness was estimated to be around 30, but the long-term effects were far more widespread. Thousands developed fatal cancers and chronic health issues, and the contaminated zone around the plant remains uninhabitable to this day.

### Lessons Learned and a Call for Vigilance:

Chernobyl serves as a chilling reminder of the need for stringent safety protocols and responsible management of nuclear technology. It underscores the importance of international cooperation and transparency in preventing

such disasters and mitigating their consequences. Beyond the immediate devastation, Chernobyl's legacy casts a long shadow on our understanding of risk and responsibility. It reminds us that the pursuit of progress must always be balanced with a deep respect for the delicate balance of our planet and the safety of its inhabitants.

## 7. The Fukushima Daiichi Tragedy: A Tsunami of Nuclear Peril (2011)

Following the devastating Tohoku earthquake, one of the most powerful ever recorded, a monstrous 15-meter tsunami slammed into Japan's northeast coast on March 11, 2011. This colossal wave crippled the cooling systems of the Fukushima Daiichi Nuclear Power Plant, triggering a cascade of events that culminated in a nuclear meltdown and release of radioactive material into the environment.



Image source:- geographical.co.uk

### 2011 Tohoku earthquake tsunami hitting Japan

#### A Chain Reaction of Catastrophe:

- **Loss of Power:** The tsunami disabled the plant's emergency generators, leaving the reactors without essential cooling.
- **Overheating and Meltdown:** Without cooling, the reactor cores overheated, leading to partial meltdowns in three reactors.
- **Hydrogen Explosions:** The buildup of hydrogen gas caused explosions in the containment buildings, spewing radioactive material into the atmosphere.

- Contamination: Radioactive isotopes spread across land, air, and water, contaminating nearby towns and agricultural areas.



Image source:- [online.org](https://www.nasa.gov)

## Fukushima Daiichi Nuclear Power Plant after the explosions

Consequences Still Unfurling:

- Human Cost: No immediate deaths were directly attributed to the radiation, but thousands were evacuated from the contaminated zone, and long-term health impacts are still being monitored.
- Environmental Scars: Marine life was impacted, farmlands became unusable, and the plant itself remains a complex decommissioning challenge.
- Social and Economic Fallout: The disaster shattered trust in nuclear power and had a profound economic impact on the region.

Lessons from the Fallout:

- Improved Safety Standards: The Fukushima disaster led to stricter nuclear safety regulations and emergency protocols globally.
- Emphasis on Renewable Energy: The accident spurred a shift towards renewable energy sources to reduce dependence on nuclear power.
- Transparent Risk Communication: The importance of accurate and transparent communication with the public during such events became evident.

Fukushima's legacy echoes beyond Japan's shores. It serves as a stark reminder of the vulnerability of nuclear technology to natural disasters and the far-reaching consequences of such accidents. Understanding its lessons is crucial for shaping a future where nuclear power, if utilized at all, operates alongside robust safety measures and a commitment to transparency and environmental responsibility.

These are just a few examples of the countless climate disasters that have shaped our world. As we face the challenges of climate change in the 21st century, understanding these past events is crucial. Their lessons can guide us in building more resilient communities, developing sustainable practices, and preparing for the inevitable climate shocks to come.

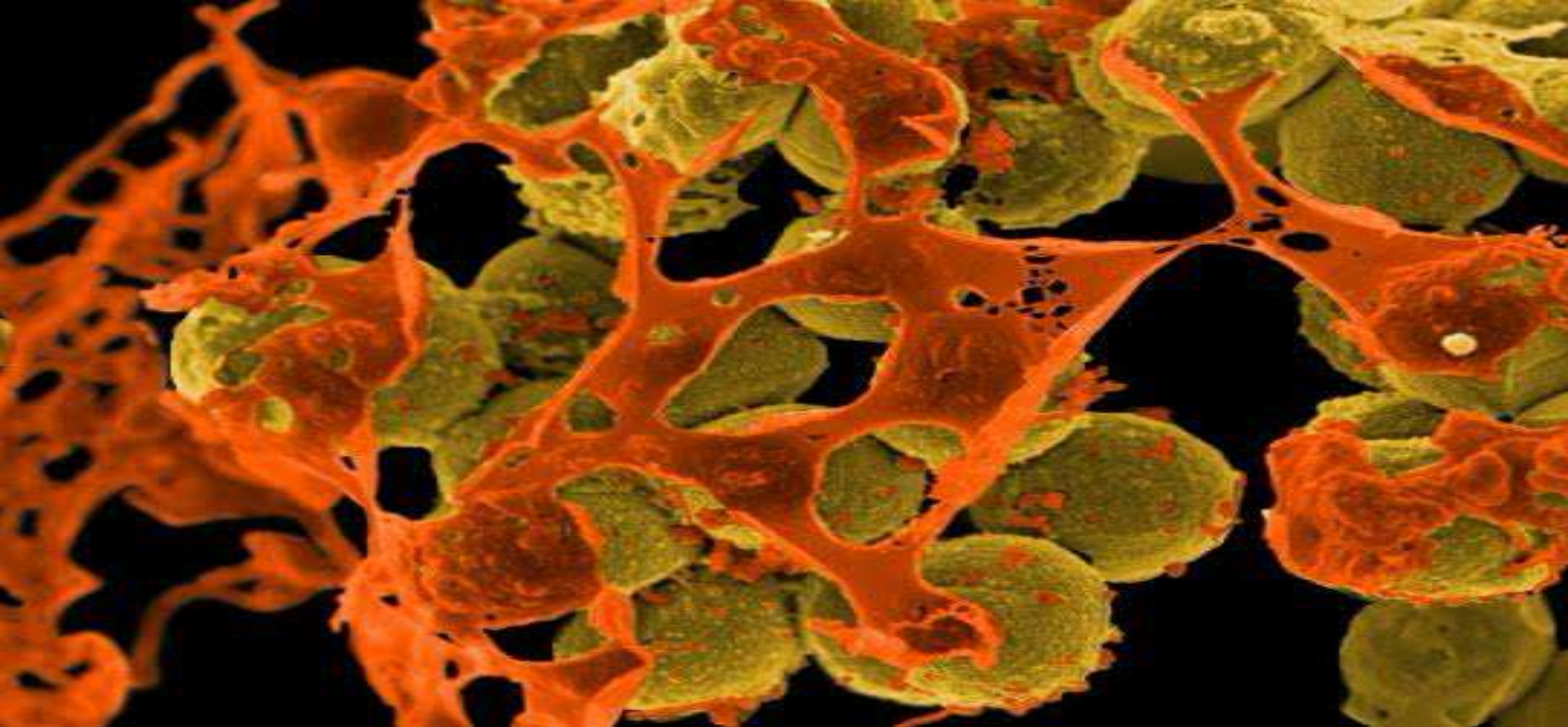
Beyond the immediate devastation, climate disasters often have lasting social, economic, and political consequences. They can trigger migrations, reshape political landscapes, and even lead to conflicts. Studying these events can help us anticipate and mitigate these long-term impacts.

Furthermore, understanding past climate disasters can inform our efforts to address climate change itself. By analyzing the historical record, we can gain valuable insights into the patterns and drivers of climate variability, which can then be used to develop more effective climate models and mitigation strategies.

In conclusion, climate disasters are not simply isolated events; they are threads woven into the fabric of human history. By learning from the scars of the past, we can build a more resilient future for ourselves and generations to come. Let us remember these events not with fear, but with a renewed commitment to protecting our planet and its inhabitants from the wrath of a changing climate.

**KAMALDEEP**  
**Department of Physics and Astrophysics**  
**University of Delhi**





# EFFECTS OF POLLUTION ON BACTERIAL RESISTANCE

As we all know, the world has evolved from traditional medicines to antibiotics and other drugs that work more efficiently than herbs and other conventional treatments. The modern-day medications that work against the infectious pathogens in our body need an alternative as the pathogens adapt against these drugs and later become resistant to these drugs, posing a threat to our health. Microbes, such as bacteria, viruses, fungi, and parasites, are living organisms that evolve. Their primary function is reproducing, thriving, and spreading quickly and efficiently. Therefore, microbes adapt to their environments and change in ways that ensure their survival. If something stops their ability to grow, which is the antimicrobial drug, genetic changes that enable the microbe to survive can occur.

## WHAT IS ANTIMICROBIAL RESISTANCE?

Antimicrobial resistance is a condition where Microbes such as bacteria, viruses and parasites no longer respond to the drugs explicitly designed to prevent infections caused by these pathogens.

Antimicrobial resistance is usually caused by various factors, such as mutation, as the microorganisms reproduce spontaneously, leading to increased genetic mutations. The new microbes show better adaptability than the older ones from which they have been produced. Gene transfer is also a factor through which the resistant bacteria may transfer their genes to the non-resistant strains, leading to the development of resistance in them.

## HOW IS POLLUTION LINKED WITH ANTIMICROBIAL RESISTANCE?

Researchers have conducted studies on antimicrobial resistance and its linkages to air pollution and observed that black carbon, which is a component of fine particulate matter (PM 2.5), is a leading air pollutant. Black carbon is a sooty black material emitted from vehicles, coal-based power plants and other sources depending upon fossil fuels. Upon constant inhalation of this pollutant, human health faces various risks, such as respiratory and cardiovascular disease, cancer (particularly lung cancer), and even congenital disabilities.

Researchers explored how air pollution affects pathogenic bacteria. Bacteria within biofilms are highly protected against environmental stresses, including metals, protease degradation, the host immune response and antibiotics. To observe the impact of air pollution on bacterial resistance, researchers from University of Leicester, England, conducted an experiment in which the biofilms were grown in the presence and absence of Black Carbon and later washed and incubated with a particular type of antibiotic. *Streptococcus pneumoniae* and *Staphylococcus aureus* were exposed to antibiotics Penicillin G and  $\beta$ -lactams Oxacillin, respectively, which inhibit cell wall synthesis.

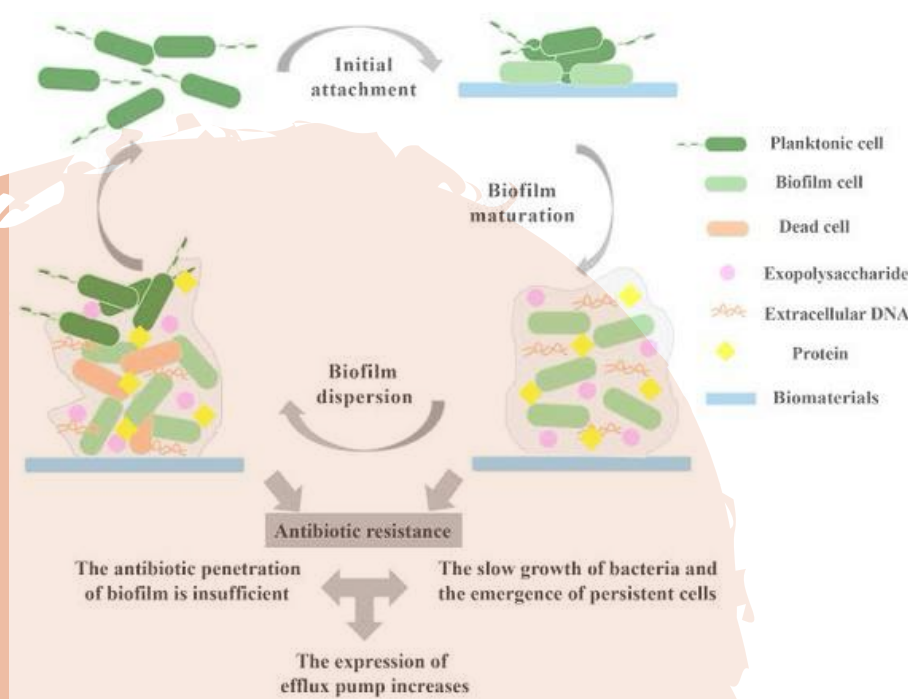
It was observed that Black Carbon caused a significant alteration in the architecture of bacterial biofilms, resulting in a structure with complex protrusion and channels. The biofilms cultured in the absence of BC had relatively flat structures and low surface area. In contrast, BC-induced biofilms were found to be thicker with relatively more irregularity and surface area.

It was noted that the concentration of each antibiotic required to markedly reduce the viability of bacteria with controlled biofilms was remarkably higher than the Minimum Inhibitory Concentration (MIC).

None of the antibiotic concentrations resulted in total bacterial eradication in controlled biofilms, clearly indicating that biofilms have increased their tolerance to antibiotics in the presence of Black Carbon as compared with Planktonic cells.

## HOW TO PREVENT ANTIMICROBIAL RESISTANCE?

The best and only way to prevent antimicrobial resistance is to use antibiotics prudently, that is, consume them only when required and complete the course of treatment throughout as prescribed by the medical professional and not skipping or leaving the doses, not taking antibiotics for viral infections as antibiotics don't work against viruses—preventing any physical contact with infected person and keeping up with regular vaccination along with finding better alternatives to antibiotics, learning from the following research, limiting the amount of pollutants of any type especially carbon to reduce the possibility of bacteria from developing further resistance and prevent threats to humans from diseases that have the potential to become incurable in the foreseeable future.



ANUSHA, USEM  
GURU GOBIND SINGH INDRAPRASTHA  
UNIVERSITY



# HARNESSING THE POWER OF BIOCHAR: A SUSTAINABLE SOLUTION FOR AGRICULTURE AND CARBON SEQUESTRATION

In the quest for sustainable agricultural practices and effective carbon sequestration methods, biochar has emerged as a promising solution. Biochar, a form of charcoal produced through the pyrolysis of organic materials, has gained attention for its potential to enhance soil fertility, mitigate greenhouse gas emissions, and contribute to sustainable agriculture. This article explores the characteristics, production process, and diverse applications of biochar, highlighting its role in addressing environmental challenges.

## What is Biochar?

Biochar is a carbon-rich material produced by heating organic biomass, such as agricultural residues, wood, or manure, in a low-oxygen environment through a process called pyrolysis. Pyrolysis prevents the organic matter from fully combusting, leaving behind a stable, carbonized residue known as biochar. This unique substance is characterized by its porous structure, high carbon content, and ability to persist in soil for hundreds to thousands of years.

## Production Process

The production of biochar involves carefully controlling the temperature and oxygen levels during the pyrolysis process. The choice of feedstock, pyrolysis temperature, and residence time influence the physical and chemical properties of the resulting biochar. The process not only produces a valuable soil amendment but also captures and stores carbon that would otherwise contribute to atmospheric carbon dioxide levels.

## Benefits of Biochar

**Soil Fertility Enhancement:** Biochar acts as a soil conditioner, improving nutrient retention and providing a stable habitat for beneficial microorganisms. Its porous structure enhances water retention, reducing the need for irrigation and promoting better crop yields. Additionally, biochar can enhance cation exchange capacity, making essential nutrients more available to plants.

**Carbon Sequestration:** One of the most significant advantages of biochar is its ability to sequester carbon. By converting biomass into a stable form of carbon that resists decomposition, biochar helps mitigate climate change by locking away carbon that would otherwise be released into the atmosphere.

**Greenhouse Gas Mitigation:** Biochar also plays a role in mitigating greenhouse gas emissions. When used in soil, it can reduce the emission of nitrous oxide, a potent greenhouse gas produced in agricultural activities. Additionally, biochar production itself can be designed to capture and utilize the by-products of pyrolysis, further reducing emissions.

**Waste Management:** Biochar provides an environmentally friendly solution for managing organic waste. By converting agricultural residues, forestry by-products, and other organic materials into biochar, we can reduce the need for landfill disposal and utilize these waste products beneficially in agriculture.



## Applications of Biochar

**Agriculture:** The primary application of biochar is in agriculture, where it serves as a soil amendment. Farmers can incorporate biochar into the soil to improve fertility, water retention, and nutrient availability. Ongoing research explores its potential for crop productivity, disease resistance, and overall soil health.

**Livestock Farming:** Biochar can also be used in livestock farming to manage manure. By converting manure into biochar, the nutrient-rich material can be returned to the soil as a stable, odor-free amendment. This not only addresses waste management challenges but also enhances soil fertility.

**Water Filtration:** The porous nature of biochar makes it an effective material for water filtration. Biochar filters can be used to remove contaminants and impurities from water, providing a sustainable and cost-effective solution for water treatment.

Biochar represents a sustainable and multifaceted solution for addressing various environmental challenges. From enhancing soil fertility and mitigating greenhouse gas emissions to providing a means of waste management, biochar holds immense promise for sustainable agriculture and environmental stewardship. As research continues to uncover its full potential, incorporating biochar into agricultural practices could contribute significantly to a more resilient and sustainable future.

**Dr. Vivek Panwar**  
Assistant Professor  
Sri Venkateswara College  
University of Delhi



# CREATING A GREENER BODY: THE EFFECTS OF BODYBUILDING DIETS ON THE ENVIRONMENT AND SUSTAINABLE SOLUTIONS

## Introduction

Step into the crossroads where physical transformation intersects with environmental impact—a space where the quest for strength and aesthetic prowess intertwines with our planet's well-being. Within the bodybuilding community, the focus has historically been on perfecting the human body, but the environmental consequences of this endeavor are sometimes overlooked. This article explores the lesser-known topic of bodybuilding's environmental effects by delving into the broad effects of dietary choices and exercise regimens. We dissect the complex web of bodybuilding's ecological footprint, from the connection between deforestation and beef consumption to the carbon footprint left by food transportation. Set out on this investigation to learn about the effects bodybuilding diets have on the environment and, more importantly, to find sustainable substitutes that harmoniously combine the goal of physical strength with taking care of our environment.

## Following are the effects of bodybuilding diet on the environment:-

### 1. Methods of Agriculture:

**Deforestation:** A common source of protein in bodybuilding regimens, the demand for beef frequently fuels deforestation. Trees are cut down to make way for grazing areas or to grow food for animals, which results in the loss of important ecosystems and biodiversity.

**Water Usage:** Serious water resources are needed for large-scale agriculture, particularly for producing meat. These processes' heavy irrigation and water usage lead to water shortage in many areas, which has a negative impact on the local ecology and population.

### 2. Farming of Animals:

**Land Use:** To cultivate feed crops and provide grazing areas, animal farming requires a large amount of land. This lowers biodiversity overall, endangers wildlife, and contributes to habitat loss.

- **Water Pollution:** Chemicals including hormones, insecticides, and antibiotics are introduced into water sources by runoff from animal farms. Aquatic ecosystems are at risk from this contamination, which also has an impact on the creatures that live there and the quality of the water.

#### Transportation of Food:

- **Greenhouse Gas Emissions:** Long-distance food delivery for bodybuilding diets has a significant negative influence on the environment. Climate change is exacerbated by vehicle emissions of greenhouse gases and the energy-intensive refrigeration required for transit.

#### Disposable Packaging:

- **Plastic Pollution:** Single-use plastics are frequently used in the packaging of dietary supplements and bodybuilding items. These plastics lead to pollution in the environment, especially in the oceans, where they endanger marine life and ecosystems.

#### Food Wastage

- **Excess Consumption:** Tight diet regimens for bodybuilders may cause people to buy more food than they need, which increases the amount of food that is wasted overall. When you consider the resources used in food production, this overindulgence has an impact on the environment.
- **Disposal:** Throwing away leftover or damaged food increases the amount of garbage that ends up in landfills and releases methane, one of the strongest greenhouse gases.

#### Enduring Substitutes:

- **Plant-Based Protein:** The environmental effect of traditional animal agriculture can be considerably decreased by promoting the use of plant-based protein sources including beans, tofu, and plant-based protein supplements.
- **Local Sourcing:** Stressing the value of obtaining food locally reduces the environmental impact of long-distance transportation and its related carbon footprint, while also bolstering local businesses.
- **Encouraging sustainable farming:** techniques, such as agriculture, agroforestry, and organic farming, can improve ecosystems and lessen the damaging impacts of conventional agricultural practices on the environment.

**Raghav Shivkumar Choubey, USEM  
Guru Gobind Singh Indraprastha University**

# BOOK

## RECOMMENDATION

### THE UNINHABITABLE EARTH: A STORY OF THE FUTURE BY DAVID WALLACE-WELLS

Author	David Wallace-Wells
Country	United States
Language	English
Genre	Non-fiction
Publisher	Tim Duggan Books
Publication date	April 16, 2019
Pages	320
ISBN	<u>978-0-525-57670-9</u>

## Summary

In "The Uninhabitable Earth," David Wallace-Wells paints a stark picture of the potential consequences of global warming, even with moderate temperature increases. He argues that the effects will be far more severe than most people realize, impacting everything from rising sea levels and extreme weather events to mass extinctions, food shortages, and societal collapse.

Key points of the book:

- **Dire Predictions:** Wallace-Wells details the potential future scenarios based on various warming levels, showcasing the cascading societal, environmental, and political issues arising from each degree of increase.
- **Beyond alarmism:** While acknowledging the severity, the book goes beyond simply raising alarm. It delves into the potential human cost, explores societal changes, and emphasizes the responsibility of the current generation.
- **Focus on human experience:** The book isn't just about scientific data. It uses vivid storytelling and personal anecdotes to make the abstract threat of climate change concrete and relatable.
- **Not all doom and gloom:** Despite the grim predictions, Wallace-Wells argues that we still have the power to avert the worst outcomes through collective action and technological innovation.
- **Call to action:** The book serves as a wake-up call, urging readers to take responsibility and advocate for change to mitigate the climate crisis.

Overall, "The Uninhabitable Earth" is a powerful and thought-provoking book that aims to shake us out of complacency and inspire action to create a more sustainable future.

It's important to remember that the book's predictions are based on scientific models and projections, and the actual future may unfold differently. However, it serves as a crucial reminder of the potential consequences of inaction and the urgency of addressing climate change.

'An epoch-defining book'

GUARDIAN



# The Uninhabitable Earth

A STORY OF THE FUTURE

David Wallace-Wells



# The Whispering Wind: A lament for lost wild things

The whispering wind, through branches bare,  
Carries a song of sorrow in the air.  
No vibrant plumes or furred forms pass below,  
Just echoes where the wild things used to flow.

The ocean's depths, once teeming bright,  
Now choked with plastic, robbed of light.  
Fish, silent schools, where laughter used to gleam,  
Replaced by ghosts, adrift in a plastic dream.

The meadows sing a tune of empty space,  
Where butterflies no longer leave their trace.  
No buzzing bees, no hummingbirds in flight,  
Just silent blooms, withering in the light.

We built our towers, claimed the land and sky,  
Blind to the whispers, as the wild things die.  
The web of life, we severed with our greed,  
Now face the silence, the barren seed.

But hark! A whisper, on the wind it rides,  
A call to heal, a chance to set things right.  
With open hearts and hands that mend,  
We can rebuild, where brokenness descends.

Plant a seed, protect a fragile wing,  
Let empathy bloom, a new song for life to sing.  
For in the wild, our own reflection lies,  
A chance to rise, beneath forgiving skies.

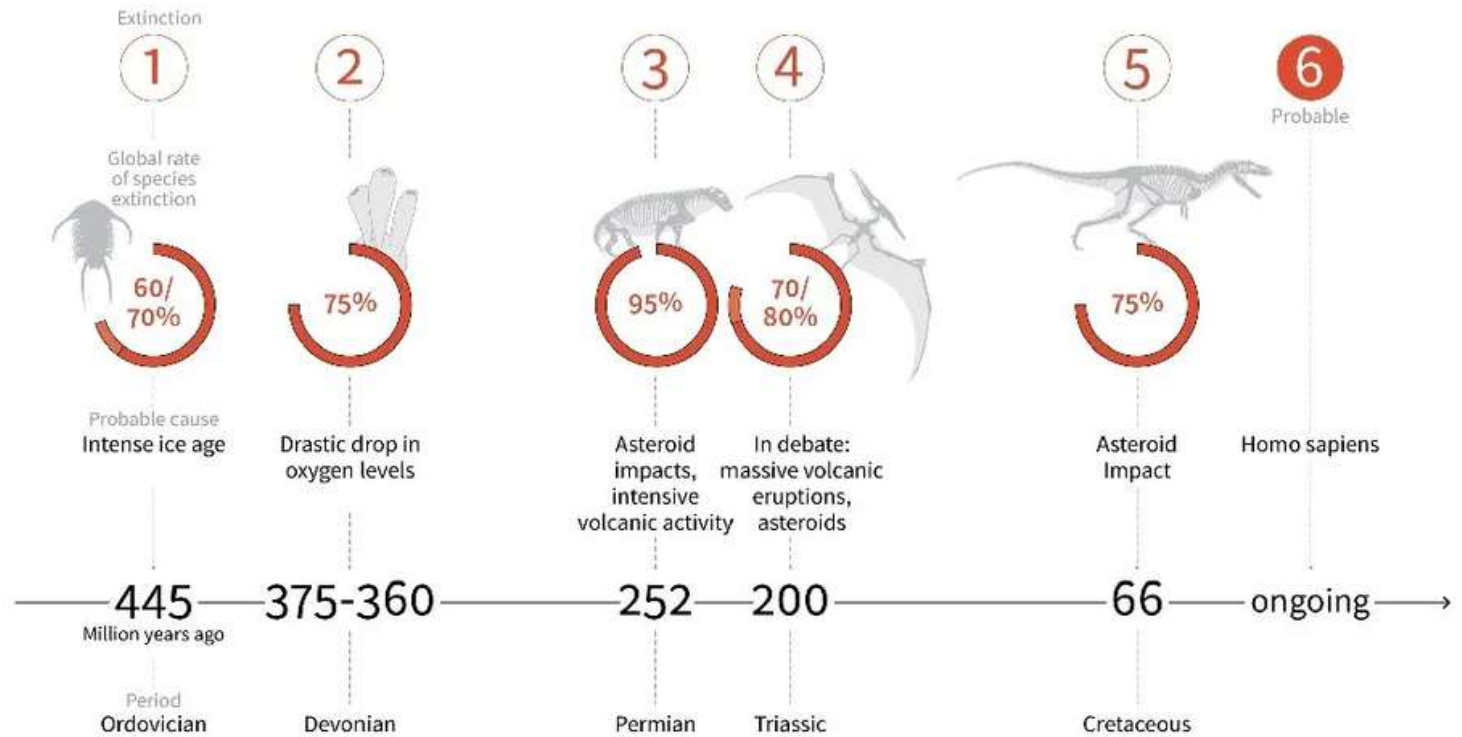
So let us listen, to the whispering wind,  
And mend the tapestry, where broken threads  
begin. For the Earth's wild heart, still faintly beats,  
Awaiting hands, to make its future sweet.



# EXTINCTION EVENTS ON EARTH TIMELINE

## Earth's "mass extinctions"

During the last 500 million years, Earth has experienced five periods when at least half the living creatures were wiped out



Sources: National Geographic, Encyclopedia Britannica, scientific studies



Associate Editors: Kamaldeep, Jagriti Hinduja

Publisher

# Earth Root Foundation

456, Pocket B, Sector-13, Dwarka, New Delhi-110078  
[www.earthrootfoundation.org](http://www.earthrootfoundation.org) | [info@earthrootfoundation.org](mailto:info@earthrootfoundation.org) | +91 8766317774

