

VOLUME 15 • AUGUST 2022

# EARTH ROOT

**Aspects, Importance  
and Issues of  
Biodiversity**

**How biodiversity is  
threatened by human  
activity**



**Loss of biodiversity in  
amazon ecosystem**

**Biodiversity  
conservation: Tropical  
rainforest**





# 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.

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<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 8766317774; +91 9990013202
<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 & Electronics, Rajdhani College, University of Delhi, Ring Road, Raja Garden, New Delhi – 110015, India

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

Profile Link: <https://www.rajdhanicollege.ac.in/Base/faculty/173>

**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**

Aryabhatta 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**

Assistant 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/Assistant\\_Professors.php](http://www.ipu.ac.in/usem/Assistant_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>

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# CLIMATE CHANGE AND BIODIVERSITY

*Mehak Tiwari*

*Shyama Prasad Mukherji College for Women, University of Delhi*

***We are living on this planet as if we had another one to go.***

***- Ms. Terri Swearingen***

This quote stands true nowadays since the way we are disturbing nature, not introspecting and retrospective of our actions, on the journey of development and fulfilling our present needs without thinking of the future and future generations is feeling that this earth has become a bar of "KitKat" for us that let's finish this one and then we have "Munch" to enjoy. But coming back to reality we don't have another "Munch" that is there is no planet B like Earth that can sustain us the way Earth has. It's time to pay back our debts. Hush Hush things about climate change but what is Climate change all about and why should we be concerned about it? Keep reading to unfold the truth and facts about how climate change is impacting biodiversity, and more importantly us.

What do we mean by both? - BIODIVERSITY and CLIMATE CHANGE Biodiversity (from "biological diversity") refers to the variety of life on Earth at all its levels, from genes to ecosystems, and can encompass the evolutionary, ecological, and cultural processes that sustain life. In simple words, if we say it is all the different kinds of life we find in one area. Biodiversity includes not only species we consider rare, threatened, or endangered but also every living thing—from humans to organisms we know little about, such as microbes, fungi, and invertebrates. Climate change refers to long-term shifts in temperatures and weather patterns.

## **Why do we need to be concerned?**

There are two reasons why climate change takes place - (a.) Natural causes and (b.) Man-made causes. Natural causes include: Volcanic Eruptions for instance Mount Pinatubo (Philippines) in 1991 caused a 0.5°C drop in global temperature. The other ones are - Ocean currents, earth orbital changes, and solar variations. The other cause of this climate change is Human induced activities that are Global Warming and the Greenhouse effect. Global warming in itself is causing a rise in sea level, changes in rainfall patterns, melting of the ice caps, bleaching of coral reefs, and many more adverse effects.



A study has revealed a report by a national daily named MINT - Several Indian cities that lie near the sea may get submerged in the next 28 years due to the rise in water level. According to the analysis by RMSI, some critical properties and road networks in Mumbai, Kochi, Mangalore, Chennai, Vishakhapatnam, and Thiruvananthapuram will be drowned by 2050 because of the rise in sea level.

The number of greenhouse gases like CO<sub>2</sub> emitted by the world needs to peak by 2025 followed by a 43% reduction in the 10 years after to limit global warming to 1.5 degrees C by the year 2100, the Intergovernmental Panel on Climate Change (IPCC).

And if this went up to 2°C, there is zero chance of surviving on this planet. Since 1800 through human-induced activities there has been a rise in the temperature and it is still on the continuum.

Almost every year in India we have fancy names for the hurricane and almost every year our coastal regions and states like West Bengal and Assam are suffering from Floods which is causing a huge loss to human life and prop

Recently only 11 pilgrims have died due to the cloud burst in the areas of Amarnath during their pilgrimage. Some species once gone extinct they won't come back such as Polar Bears and Orangutans.

A fine example of climate change can be explained as earlier the species of bears used to have food stay in their habitat and used to hibernate for around half an year but now their sleeping patterns has changed due to lack of food they are now being more attacking towards humans which is not in their tendency.

## EFFECTS OF CLIMATE CHANGE

- **Hotter temperatures:** Higher temperatures increase heat-related illnesses and can make it more difficult to work and move around. Wildfires start more easily and spread more rapidly when conditions are hotter.
- **More severe storms:** Changes in temperature cause changes in rainfall. They cause flooding and landslides, destroy homes and communities, and cost billions of dollars.
- **A warming, rising ocean:** The ocean soaks up most of the heat from global warming. This melts ice sheets and raises sea levels, threatening coastal and island communities. The ocean also absorbs carbon dioxide, keeping it from the atmosphere. More carbon dioxide makes the ocean more acidic, which endangers marine life.
- **Loss of species:** Climate change poses risks to the survival of species on land and in the ocean. Forest fires, extreme weather, and invasive pests and diseases are among many threats. Some species will be able to relocate and survive, but others will not.
- **Not enough food:** Changes in climate and increases in extreme weather events are among the reasons behind a global rise in hunger and poor nutrition. Fisheries, crops, and livestock may be destroyed or become less productive. Heat stress can diminish water and grasslands for grazing.



Earlier there were many places where ice caps could be found but this climate change has now left us with only two places, Antarctica and Greenland. Research has shown that if the ice caps of Antarctica melt it will lead to an increase of 60 meters in sea level and if Greenland ice caps melt it can lead to an 8 meter increase in the sea level.

## Conclusion

Some years back we used to say that we are running short of time but now we are not running short of time but the time is up and now the thing is on survival and more like a Do or Die situation. How we should be serious and cautious is that we are not being that. Miracles don't happen, we have to create them. Nowadays actions against climate change are not just protecting the earth but protecting ourselves as well. So by our lifestyle

modifications like going vegan, carpooling, and ideas like blogging emerged Sweden, a country that is always on top in design thinking to solve anything. Some simple steps such as sustainable architecture, segregation of waste, and afforestation can also be a huge help Some years back we used to say that we are running short of time but now we are not running short of time but the time is up and now the thing is on survival and more like a Do or Die situation. How we should be serious and cautious is that we are not being that. Miracles don't happen, we have to create them. Nowadays actions against climate change are not just protecting the earth but protecting ourselves as well. So by our lifestyle modifications like going vegan, carpooling, and ideas like blogging emerged Sweden, a country that is always on top in design thinking to solve anything. Some simple steps such as sustainable architecture, segregation of waste and afforestation can also be a huge help.

- **More health risks:** Changing weather patterns are spreading diseases such as malaria. Extreme weather events increase diseases and deaths, and make it difficult for health care systems to keep up. Other risks to health include increased hunger and poor nutrition in places where people cannot grow or find sufficient food.
- **Poverty and displacement:** Climate change increases the factors that put and keep people in poverty. Floods may sweep away urban slums, destroying homes and livelihoods. Heat can make it difficult to work in outdoor jobs. Weather-related disasters displace 2.3 crore people a year, leaving many more vulnerable to poverty.





# HOW HUMAN HEALTH DEPENDS ON BIODIVERSITY

*Sunanda Maurya*

*IIMT college of management, Greater Noida*

## What is Biodiversity?

The diversity and number of many species of flora and fauna in any given nature area are called the biodiversity of that particular place. Biodiversity is the most complex feature of our planet and it is the most vital. "Without biodiversity, there is no future for humanity". Says Prof David Macdonald, at the Oxford University.

## Human health depends on Biodiversity.

There are many things for which we depend on biodiversity and it is important for us to conserve it. Take for example- agriculture is incredible dependent on invertebrates, they help maintain soil health. while many fruits, nuts and vegetables are pollinated by insects.

Pollinators such as birds, bees and other insects play an important role in one-third of the world's crop production. Microbes are important for releasing nutrients into the soil. In the oceans, fish and other forms of marine life provide the main sources of the protein for approximately one billion people.

People depend on Biodiversity in their daily lives in ways that are not always apparent or appreciated.

Human health ultimately depends upon ecosystem products and services (such as availability of fresh water, food and fuel sources) which are requisite for food, human health and productive livelihoods.

Biodiversity loss can have significant direct human health impacts. If ecosystem services are no longer adequate to meet social needs. Indirectly, changes in ecosystem services affect income, livelihood, local migration and on occasion, may even cause or exacerbate political conflict.

Also, biological diversity of microorganism, flora and fauna provides extensive benefits for biological, health and pharmacological sciences. Significant medical and pharmacological discoveries are made through greater understanding of the earth's biodiversity. Loss in biodiversity may limit discovery of potential treatments for many diseases and health problems.

Biodiversity plays a crucial role in human nutrition through its influence on world food production, as it ensures that sustainable productivity of soils and provides the genetic resources for all crops, livestock and marine species harvested for food. Access to a sufficiency of a nutritious variety of food is a fundamental determinant of health.





# HOW BIODIVERSITY IS THREATENED BY HUMAN ACTIVITY

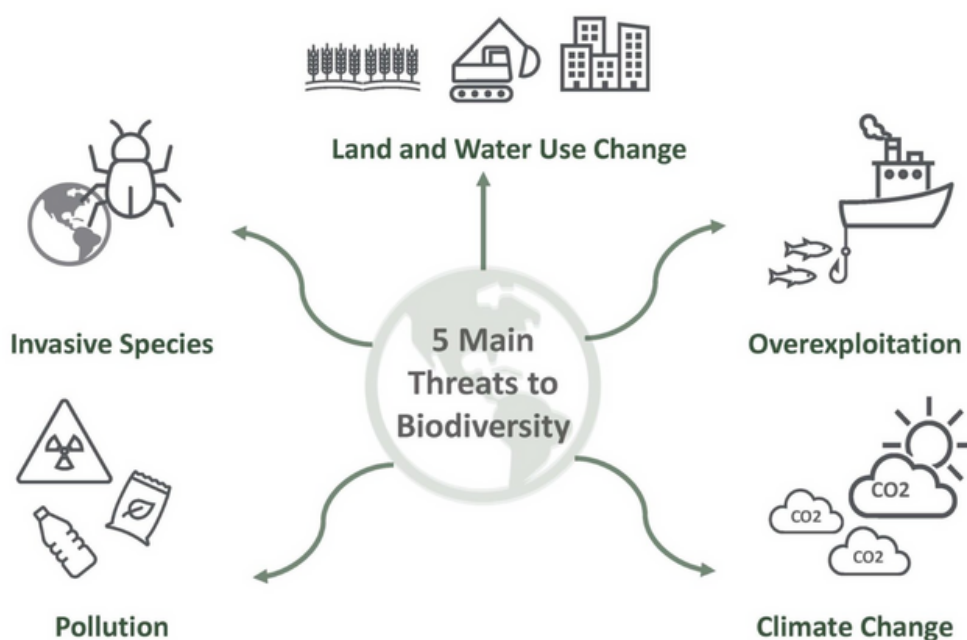
*Nimarpreet Kaur Kalsi*  
*Mata Sundri College For Women, New Delhi*

Humanity impacts the planet's biodiversity in multiple ways, both deliberate and accidental. The biggest threat to biodiversity to date has been the way humans have reshaped natural habitats to make way for farmland, or to obtain natural resources, but as climate change worsens it will have a growing impact on ecosystems.

The main direct cause of biodiversity loss is land use change (primarily for large-scale food production) which drives an estimated 30% of biodiversity decline globally. Second is overexploitation (overfishing, overhunting and overharvesting) for things like food, medicines and timber which drives around 20%. Climate change is the third most significant direct driver of biodiversity loss, which together with pollution accounts for 14%. Invasive alien species account for 11%.



Growing demand for natural resources due to the increasing human population, more rapidly increasing per capita consumption, and changing consumption patterns has meant that ever more natural habitat is being used for agriculture, mining, industrial infrastructure, and urban areas.



Design: Abby Litchfield

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Human activities are causing major changes in biological communities worldwide.

These changes can harm biodiversity and ecosystem function.

Ecosystem function is important for supporting plant and animal communities and ensuring our long-term survival.

**The main threats facing biodiversity globally are:**

- Destruction, degradation and fragmentation of habitats, or homes, for plants animals and fungi.
- Reduction of the ability of life to survive and reproduce because of exploitation, pollution and introduction of alien species.

Species do not all respond equally to these threats. Declines in species often reflect the relationships between species and ecological patterns.





# WATER CONSERVATION

*Manisha Mani*

*Packaging technologist*

Water is one of the important elements that propagate life on earth. About 70% of the earth's surface constitutes water and is home to the aquatic system. Life forms on earth and water are majorly interdependent. One-quarter of the earth is facing looming causes due to water crisis and scarcity.

The first reason that is causing water stress around the world is the growing human population at the same time as the water supply has remained the same. The second reason is the uneven concentration of the global population.

There is not a clear link between the presence of the population in some regions and the presence of water, in other words, water is not where we want it to be every time. For example, there is, what we call, a 'triangle of thirst' from southern Spain, to Pakistan, to the Horn of Africa, and back again. In this triangle, you have around two billion people in a very water-scarce region.



SOURCE- stockunlimited

Water scarcity involves water crisis, water shortage, water deficit or water stress. Water scarcity can be due to physical water scarcity and economic water scarcity.

Physical water scarcity refers to a situation where natural water resources are unable to meet a region's demand while economic water scarcity is a result of poor water management resources.

Hence the main need of the hour becomes how to supply or overcome the challenges of water scarcity in this water scarce region on the earth affecting the health of the people. When there is no rain in drought-affected areas, the crop cycle gets affected due to less irrigation. If water scarcity persists over a longer period, it may also lead to the destruction of whole habitats. Animals and plants may no longer be able to get enough water and may therefore die or have to move to other regions.



SOURCE- lovepic

## SOLUTION FOR WATER SCARCITY AND CONSERVATION

### Rainwater Harvesting - Water Recycling

Since freshwater reserves like rivers, groundwater, and other water bodies are becoming scarce, rainwater harvesting is the alternate source of clean water reserves. Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer, or a reservoir with percolation so that it seeps down and restores the groundwater. Installations can be designed for different scales including households, neighborhoods, and communities, and can also be designed to serve institutions such as schools, hospitals, and other public facilities. In regards to urban agriculture, rainwater harvesting in urban areas reduces the impact of runoff and flooding. Solar panels can be used for harvesting most of the rainwater falling on them and drinking quality water, free from bacteria and suspended matter, can be generated by simple filtration and disinfection processes as rainwater is very low in salinity.



SOURCE- 123RF



SOURCE- shutterstock

Rainwater harvesting provides the independent water supply during regional water restrictions, and in developed countries, it is often used to supplement the main supply. It provides water when a drought occurs, can help mitigate flooding of low-lying areas, and reduces demand on wells which may enable groundwater levels to be sustained and can be made cost effective from collective approach.



SOURCE- dreamstime

### Portable Water

Potable water, also known as drinking water, comes from surface and ground sources and is treated to levels that meet state and federal standards for consumption. Water from natural sources is treated for microorganisms, bacteria, toxic chemicals, viruses and fecal matter. The State Water Resources Control Board ensures the actual levels are close to Public Health Goals while setting standards called "notification levels" for contaminants not specified by the EPA.



## Wastewater treatment

Wastewater or sewage treatment is a process used to remove contaminants from wastewater and convert it into an effluent that can be returned to the water cycle. Once returned to the water cycle, the effluent creates an acceptable impact on the environment or is reused for various purposes called water reclamation. Water is used in the industrial sector for production and wastewater is generated as part of the product cycle. These water can or effluent needs to be treated before its reuse or disposal to avoid further environmental impact. Types of wastewater treatment plants include agricultural wastewater treatment plants and leachate treatment plants.



SOURCE- 123RF

Sedimentation is the primitive method used for wastewater treatment. Phase separation using filtration is also used. Biological and chemical treatments are the most commonly used effluent treatment methods these days. Activated sludge treatment, distillation, desalination, filtration, osmosis, and aerobic and anaerobic treatment are the various method used according to chemical and biological entities present in the wastewater.



SOURCE- dreamstime



SOURCE- shutterstock

## Save Water Initiatives

Educating people dealing with scarcity of water can help in curbing the water related issues by effective use of water generation technology and minimal usage. Water distribution should be managed effectively by gauging the need and supply of the water . Some voluntary initiatives to save water with minimal wastage can help to reduce the consequences of water scarcity by limiting the use of water, the use of washing machines, taking short showers instead of full baths. Educating farmers for better irrigation methodologies can help in maintaining the crop cycle and yield. Support clean water initiatives by being part of the organizations located all over the world that are looking to bring clean water to areas that don't have it. Consider donating to these organizations, either with your time, your skills, or your finances whichever you can afford to give to them.

# ASPECTS, IMPORTANCE AND ISSUES OF BIODIVERSITY

*Ritika Sen*

*Freelance content writer*

The term biodiversity is a accumulation of two words - Biological+Diversity. It is referred as the variety of life on this planet Earth at all the levels i.e. from genes to ecosystems. It can enclose the evolution, ecology, and cultural processes that sustain life on Earth. There are four aspects of biodiversity:-

1.Species Diversity-Each and every ecosystem of this planet contains a unique collection of species which are interacting with each other in their own ways.

2.Genetic Diversity-This diversity describes how closely members of a species are related to each other .i.e., if all the members have similar genes, the species will have low genetic diversity.

3.Ecosystem Diversity-A region itself can have a variety of ecosystems.

4.Functional Diversity-Behavior of species, its ability of obtaining food and using its natural resources in an ecosystem is called functional diversity.

Biodiversity is important as it is vital component for all the life on Earth. Importance of biodiversity can be classified in further five categories:-

1.Ecological Importance-ecological factors such as preventing soil erosion, care of health of an ecosystem, pollution management, nutrient recycling is considered.

## The Importance of Biodiversity





2.Social Importance-Biodiversity plays a decisive role in providing social benefits like improved employment facilities and the social services for people.

3.Economic Importance- economic importance in terms of source for food, fuel and growth factors of ecosystem.

4.Scientific Importance-scientific importance refers in performing experiments and researching on plants and genes of organisms to create new crops and medicines for the betterment of society.

5.Ethical Importance-Healthy biodiversity is able to protect all forms of life sustaining in it.

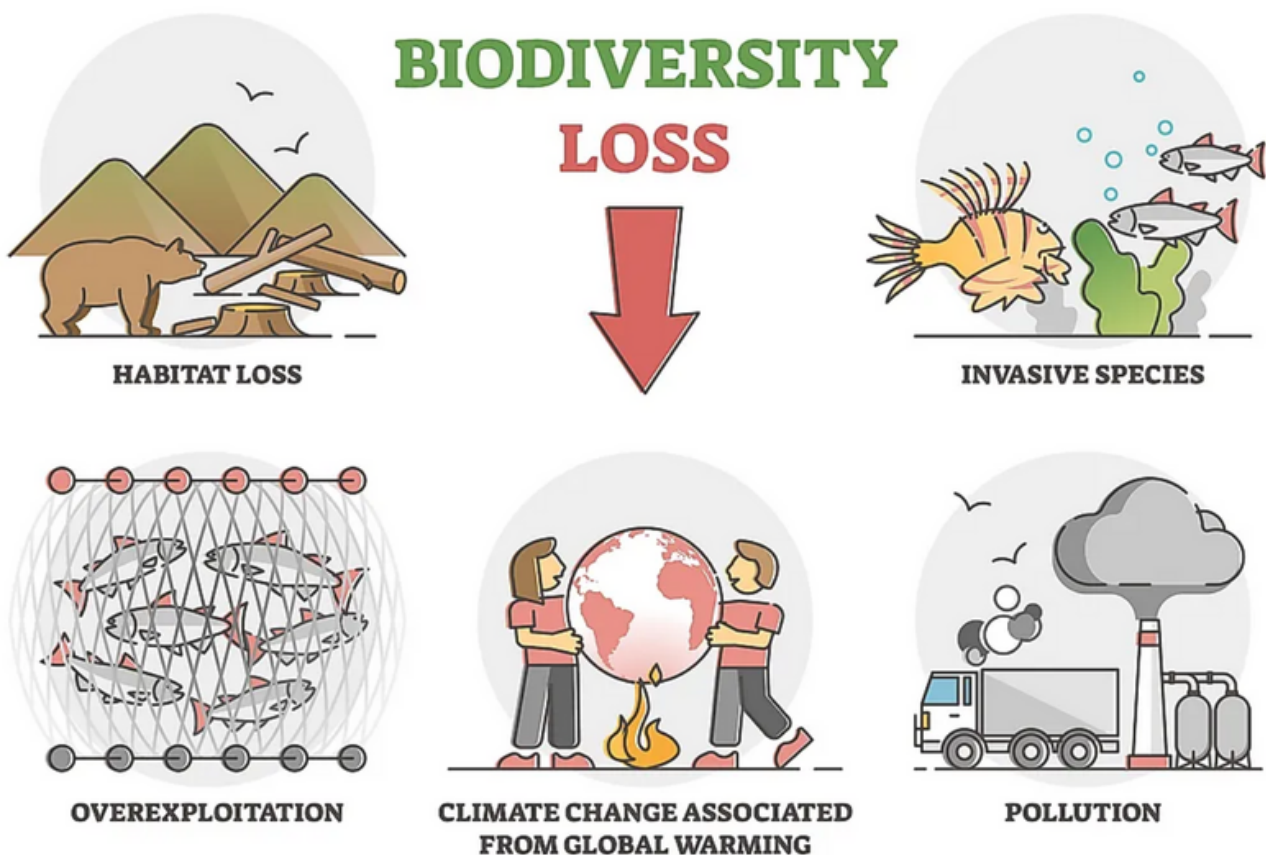
Biodiversity loss or loss of biodiversity is referred as a decrease in the biodiversity within a species or ecosystem or any geographical area infact on a whole the planet Earth. Biodiversity loss is mainly divided into two types:-



1.Natural biodiversity loss-loss of biodiversity due to natural disasters or threats and climatic changes.

2.Human-Driven biodiversity loss-Biodiversity losses from inconvenience caused by humans like deforestation, pollution and overexploitation.

**"If there is Biodiversity- there is us,if no- then no one."**



source: worldatlas.com

# MOVIE RECOMMENDATION: TOMORROW

*Mehak Tiwari*

*Shyama Prasad Mukherji College for Women, University of Delhi*



Cinema can easily change people's opinions and their outlooks on life. Good films almost always impact the viewer; just how much varies by movie and person. Individually, people are bound to get affected by movies given that a main goal the cinematic art form has is exactly to impact and send a message. When the world is fighting and being stressed out about the agenda of climate change.

The Bangladeshi filmmakers tried an attempt to make this issue alive in our consciousness by making a movie TOMORROW released in 2019.

Tomorrow is a 2019 computer animated Bangladeshi short film directed by Mohammad Shihab Uddin which was released in 2019 on Deepto TV. The film was produced by Kazi Zahin Hasan and Kazi Zeeshan Hasan for Kazi Media Limited while Cycore Studios provided the animation and production services for the film. The main purpose of the film is to explain the climate change crisis to children. It won the best animation film award at Cannes world film festival for the month of August, 2021.





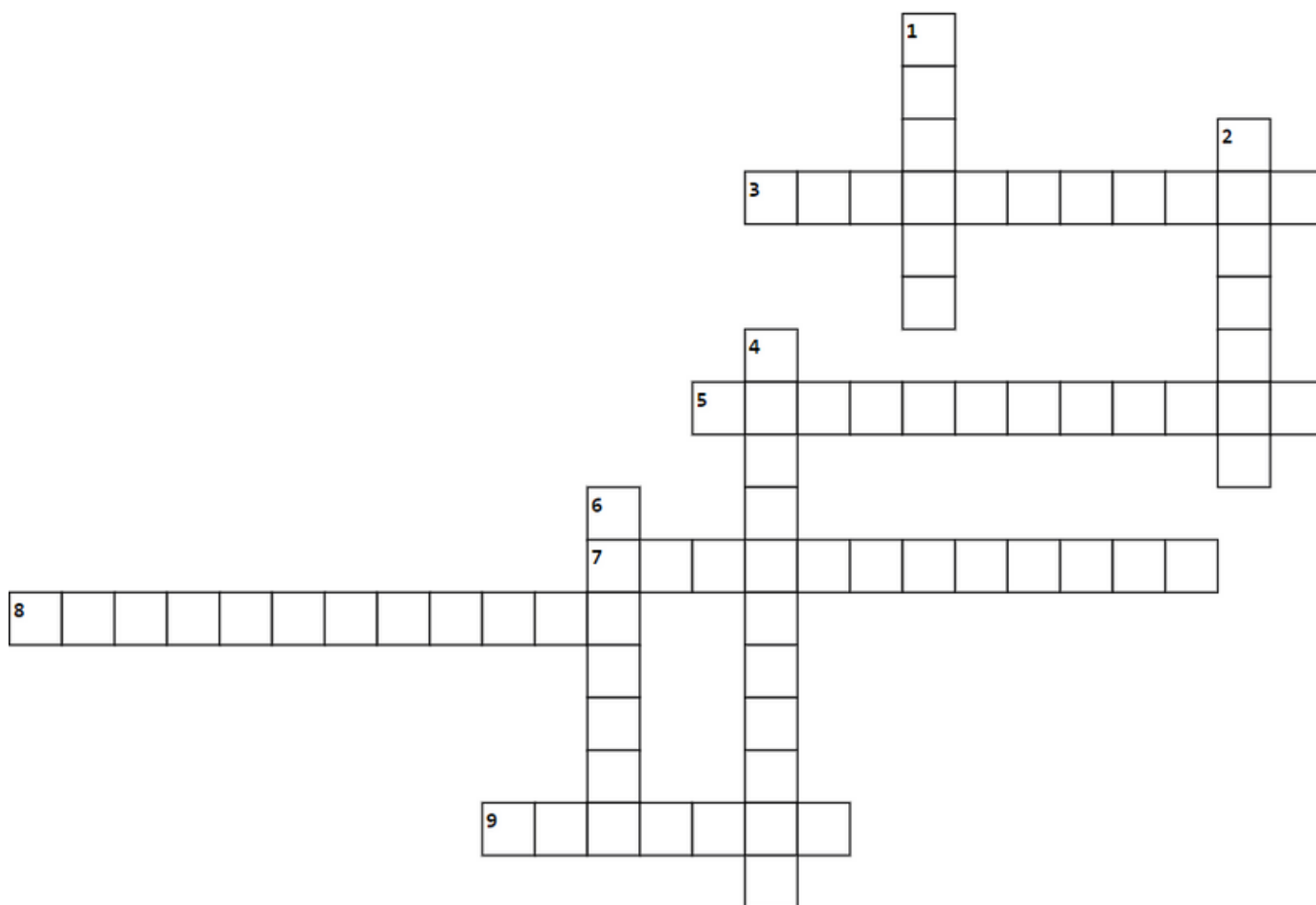


The running time of the movie is 25 mins and is classified as a short movie with an IMDb rating of 9.4 out of 10. The plot of the movie revolves around Ratul - a young boy and an old man "wind of dreams" who takes the boy with him on a set of turmoil of climate change. The boy realises and is concerned about the aspects and the entire movie promotes positivity by building a futuristic better world in spite of facing the climate change horrors. The movie's wind of dreams can be related with the ghost character of ghost in the movie "Christmas carol" which was an adapted version of the novel written by Charles Dickens. The amazing screenplay, great concept and voiceover beautified the entire movie. This movie is suitable for children and can be seen by adults as well to think deeply and act accordingly about the issue of climate change.

TOMORROW was released in Bengali and dubbed into English on the request of viewers and later released in various languages. Available on YouTube. A great blessing to the Bangladeshi cinema and to the worldwide movie industry.



# CROSS WORD



## Across

- 3. movement from one place of residence to another on a regular basis
- 6. genetic basis of a trait in an organism
- 7. the natural environment in which an organism normally lives
- 8. the formation of new species

## Down

- 1. a series of dynamic, non-seasonal changes in ecosystem structure
- 2. the shape of the surface of the earth
- 4. the functional unit of heredity
- 5. no longer living





## CREDITS

EDITOR-IN-CHIEF

: DR. VIVEK PANWAR

EDITORS

: PROF. S K DHAKA  
DR. NARENDRA SINGH  
DR. DEEKSHA KATYAL  
DR. PAWAN KUMAR

ASSOCIATE EDITOR

: SHREYANSHI CHAUDHARY

GRAPHIC DESIGNERS

: VAIBHAV VERMA  
NIMARPREET KAUR KALSI  
KAMALDEEP



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



@earthrootfoundation



@EarthRootFound1



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