



Maharashtra Education Society's
Abasaheb Garware College (Autonomous), Pune
Department of Zoology

Zoo-Verse



E-Magazine Vol 1 '2025



MAHARASHTRA EDUCATION SOCIETY'S

ABASAHEB GARWARE COLLEGE (AUTONOMOUS)
NAAC ACCREDITED 'A'
BEST COLLEGE AWARD SAVITRIBAI PHULE PUNE
UNIVERSITY
KARVE ROAD PUNE - 411004



Department of Zoology



From the Principal's Desk.....

Dear Students and Faculty members of the Zoology Department, as we are celebrating another academic year, I am delighted to introduce the first edition of our Zoology Department E- Magazine. This publication is a testament to the hard work, dedication, and passion of our students and faculty.

The field of zoology is vast and fascinating, and our department continues to excel in research, education, and community outreach. From exploring the intricacies of animal behavior to understanding the complex relationships between species and their environments, our students and faculty are at the forefront of zoological research.

This magazine showcases the achievements, research, and experiences of our students and faculty members. It highlights the department's commitment to academic excellence, innovation, and social responsibility.

I would like to extend my gratitude to the editorial team, contributors, and designers who have worked tirelessly to bring this magazine to life. Your efforts are truly appreciated.

I hope you enjoy reading this edition of our magazine. Let us continue to strive for excellence, innovate, and inspire each other to make a positive impact on our world.

Best regards,

Prof. Dr. Vilas Ugale
Principal,
MES Abasaheb Garware College (Autonomous).



From Head of Department's Desk.....

Dear Students, Faculty members, and Alumni of the Zoology Department,

The date 30/03/2025 marks the Hindu New Year. It is an auspicious occasion where we celebrate spring along with the spirit of life. To make it memorable we happily present the Zoology department's first edition of ZOO-VERSE, our E- magazine to you all. As we celebrate the achievements and contributions of our students, faculty, and alumni, we are reminded of the department's rich history, academic excellence, and commitment to innovation.

This magazine showcases the diverse research interests and activities of our faculty and students, highlighting the department's strengths in areas such as conservation biology, ecology, evolutionary biology, and wildlife science. We are proud of our department's reputation for academic rigor, hands-on learning experiences, and community engagement.

I would like to express my gratitude to the editorial team, contributors, and designers who have worked diligently to produce this magazine. Your efforts have resulted in a publication that truly reflects the spirit and accomplishments of our department.

As we look to the future, we remain committed to providing our students with the best knowledge, positive outlook and developing scientific temperament.

Prof. Dr. Nirbhay Sudhir Pimple
Head, Department of Zoology
MES Abasaheb Garware College (Autonomous).

Faculty Members -

Ms. Amita Naik

Dr. Parna Bhadra

Ms. Sneha Shirse

Ms. Amruta Tangade

Dr. Shruti Paripatyadar

Mr. Shirraj Jakhlekar

Ms. Manisha Kandroo

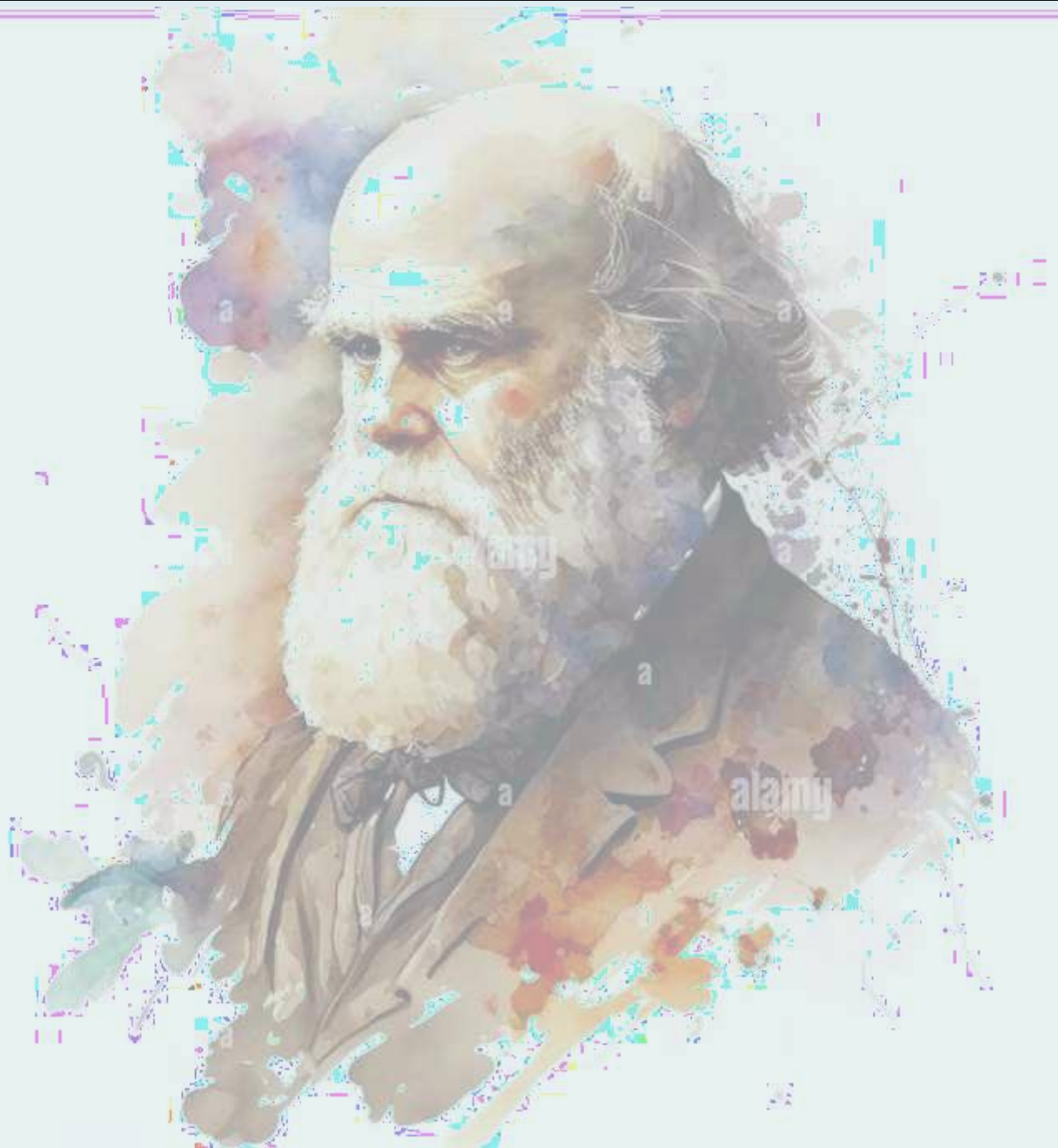
Editorial Committee: In-charge- Prof. Dr. Nirbhay Sudhir Pimple

Student Editor: Aryan Apte (T.Y. B.Sc.)

Co-Editor: Himanshu Thorat

Teacher In charge: Dr. Parna Bhadra

Issue design, layout and formatting: Aryan Apte (T.Y. B.Sc.)



**“It is not the strongest of the species that survives,
not the most intelligent that
survives, it is the one that is the most adaptable to
Change”**

-Charles Darwin

Content

Sr. No.	Article	Page No.	Author
1	ENDOCRINE-DISRUPTING CHEMICALS (EDCs)	8	Aarushi Poyrekar
2	Fast Fashion: A faster route towards global crisis	10	Arushi Mishra
3	Pollution due to urbanization	13	Akanksha Das
4	When myths come to life	16	Akash Joshi
5	Rivers- who worries about tears?	20	Anagha Vempaty
6	The Paris Agreement	22	Aryan Apte
7	Conservation: Need of today	24	Bela Ratanjankar
8	Bioluminescent forests	26	Disha Jain
9	The Buzz Beneath: Inside the world of bees	28	Grishma Purant
10	Per Aspera Ad Magnitudinem	30	Himanshu Thorat
11	Social Structure in Animal Kingdom	32	Jay Bahar-Patil
12	Research Project – Effect of Tianeptine on chick embryo	34	Kaushik Karandikar
13	Environmental impact of fast fashion	37	Nupur Vaidya
14	Protecting our Environment: A shared Responsibility	40	Rohan Ade
15	Menstrual Waste Management	42	Rutuja Arun Kute
16	From Beach trash to Global crisis	44	Satish N. Pawar
17	Effects of Radioactive matter on environment	45	Saumitra P. Patankar
18	Earth's environment and the future of space	47	Shubham Khadsare
19	Make a difference, start today	51	Simran Khan
20	India's fight against climate change	52	Uday Jadhav
21	Pollution due to deforestation	54	Vaibhavi Vaidya
22	Environmental issue concerning India and the world	57	Dr. Nirbhay Sudhir Pimple
23	Masters of the grasslands	60	Ms. Amita Naik w/ Aryan apte
24	Waste Management: A major issue in cities	64	Ms. Sneha Shirse
25	Climate change and the possibility of future pandemics	66	Dr. Shruti Paripatyadar
26	Self-Purity	67	Dr. Parna Bhadra
27	Into The Wild: A zoological expedition	70	Himanshu Thorat

Author - Aarushi Poyrekar

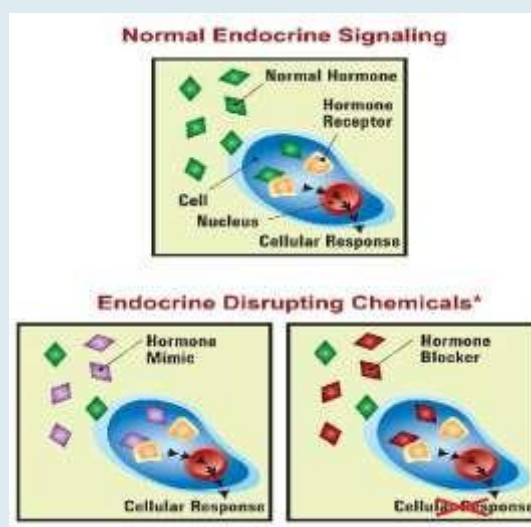
T.Y. B.Sc.

13/03/2025



ENDOCRINE-DISRUPTING CHEMICALS (EDCs): WHAT ARE THEY AND HOW DO THEY AFFECT US

Endocrine-disrupting chemicals (EDCs) are naturally occurring or artificially synthesized chemicals which disrupt hormonal mechanisms, causing catastrophic health impacts among humans and animals. The chemical substances, widespread in plastics, pesticides, industrial effluence, and medicine, either compete with or oppose hormones, destroying the normal bodily processes.

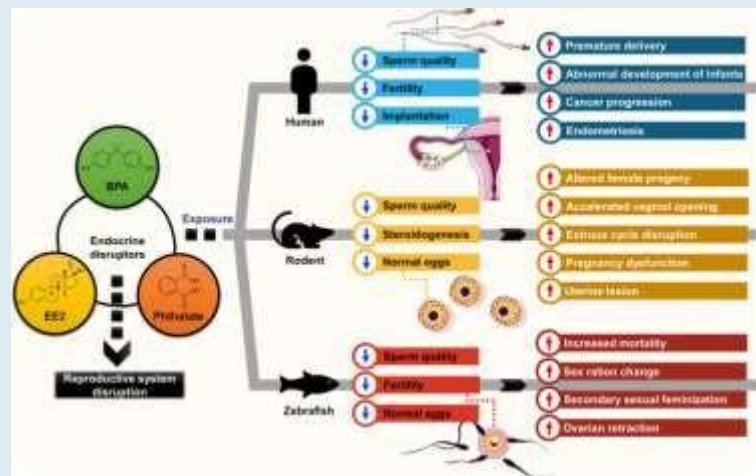


Environmental and Zoological Impact

EDCs are introduced to ecosystems via industrial discharge, farm runoff, and dumping of plastic items. They concentrate in water systems, initially targeting aquatic life. EDCs such as bisphenol A (BPA) and phthalates have been correlated with sex reversal in male fish, amphibian reproductive failure, and thyroid disruption in birds and mammals. Predators further up the food web, including human beings, experience bioaccumulation, with resultant long-term health effects.

Human Health Issues

EDCs have, in human beings, been related to hormone disruptions, reduced fertility, development malformations, and cancer. Prenatal exposure of people to such substances has, based on studies, been identified as the causation of congenital abnormalities, brain damage, and immune malfunctions. Polluting chemicals used as drugs in sources of drinking water have contributed to decreased sperm densities and augmented levels of hormone-based diseases.



Ways of Capping Exposure to EDC

Lessening the influence of EDCs needs both individual action and systemic reform:

- Refuse plastics that contain BPA and phthalates – use glass or stainless-steel containers.
- Employ natural personal care products paraben-free and fragrance-free.
- Promote organic agriculture to lessen pesticide pollution.
- Dispose of medicines properly to avoid water pollution.
- Encourage more stringent environmental policies controlling industrial emissions and waste treatment.

A Call for Action

Wildlife research serves as an early warning sign, calling attention to hazards that subsequently occur in human populations. A multifaceted method that integrates zoology, ecology, and medicine is necessary for grasping and combating the consequences of EDCs, making future generations of both humans and ecosystems healthier.

Author - Aarya Mishra

S.Y. BSc

20/03/2025



EDIBLE VACCINE:

A NEW APPROACH TO ORAL IMMUNISATION

Have you ever imagined how would you live if you weren't vaccinated against tetanus, diphtheria, polio etc? The amount of prevented sufferings and deaths by vaccination is incredible! But even now every 20 second, one child dies from vaccine preventable diseases. It is so due to the key disadvantages of typical vaccine production. However, in the last decade, advancement in field of medicine and healthcare along with the fusion of human intellect and nature, lead to one of the most promising directions in research by developing the concept of "Edible Vaccine".

As we humans try to reduce our impact on the planet, all sorts of products, from pizzas and meatballs to shoes, are going plant based. And now, even vaccines have joined this trend. Edible vaccines are the resilient seeds that, by just being nourished, offer defense against illness. These living treatments hint at a future where immunity blossoms with every bite in a world that strives for egalitarian healthcare.

In the fields of immunology and biotechnology, edible vaccines are a novel and exciting development. They are created by genetically altering edible plants to express antigens that trigger an immunological response in the body when ingested. This method provides a needle-free, affordable substitute for traditional injectable vaccines, which is especially advantageous for communities in low-resource environments.

In order to create edible vaccinations, a gene expressing a particular antigen must be inserted into the genome of an appropriate plant species. Plants like lettuce, grains, tomatoes, potatoes, and bananas are frequently used. When the plant-derived antigen is consumed, the immune system produces antibodies because the gut-associated lymphoid tissue (GALT) recognizes it. The normal immunological response that conventional vaccines generate is mimicked by this method.

Compared to traditional immunization techniques, edible vaccines are cost-effective since they don't require complex facilities or cold chain storage. Edible vaccinations may

flourish in both large cities and isolated villages, reaching the vulnerable without the need for refrigerated vehicles or sterile hospitals. By removing the possibility of needle-related infections and injuries, oral immunization also improves patient comfort and safety. They ensure sustainability in every leaf as they are produced from soil and sunlight, integrating immunity into the natural cycle of life and minimizing the need for resource-intensive manufacturing and delivery.

Edible vaccinations serve as resilient barriers against the ravages of cholera and hepatitis B. They promise a silent but unwavering defense in areas with limited access to healthcare. Their potential to combat rotavirus, malaria, and possibly new pandemics is still being discovered. These plant-based treatments could eventually calm the storms of allergies, cancer, and autoimmune diseases in addition to infectious diseases. Every bite might bring with it the promise of recovery in addition to the power of immunity.

Notwithstanding their benefits, there are a number of obstacles to the creation and use of edible vaccines. The delicate issue of guaranteeing antigen stability, the moral implications of genetic change, and the skepticism that frequently accompanies innovation are major challenges faced. It can be difficult to guarantee consistent antigen expression in various plant sections and growing environments. In addition to that, the approval procedure for vaccines made from genetically modified plants is intricate and differs by location. Public awareness efforts, strong regulatory frameworks, and ongoing research are needed to address these issues.

With continuous developments in genetic engineering and plant biotechnology, the future of edible vaccines appears bright. The creation of multivalent edible vaccinations that offer protection against several illnesses is being investigated by researchers. Furthermore, including edible vaccines into current immunization programs has the potential to greatly improve global health outcomes. For edible vaccines to move more quickly from lab research to real-world use, cooperation between governments, academic institutions, and pharmaceutical corporations is crucial. Edible vaccinations have the potential to revolutionize disease prevention and management worldwide with additional scientific and regulatory advancements.

In fields of green where sunlight plays,

A future blooms in gentle rays.

No needles sharp, no bitter sting,

Just nature's touch—her gift to bring.

Imagine a time in the future when gardens serve as both a source of nourishment and healing; when the humble potato provides protection from invisible dangers, and when the sweetness of a banana carries the power of protection. Vaccines that are edible serve as a reminder that nature has the capacity to heal, protect, and bring people together. They are evidence of our long-held conviction that, like fields in blossom, health should flourish freely and unfettered. A nibble becomes a gesture of optimism, a seed planted for years to come. Every meal is a promise in this vision: no one will be left helpless, and everyone will benefit from the harvest of immunity.

Author – Akanksha Das

S.Y. BSc.

22/03/2025



Pollution due to urbanization

Introduction:

What is called Pollution? Pollution is the introduction of harmful materials into the environment. Also defined as the presence of substance or heat in environmental media (air, water, land) whose nature, location or quantity produce undesirable environmental effects. What is called urbanization? Urbanization is the process of a population shift from rural to urban areas, leading to the growth of cities and towns and corresponding decrease in the proportion of people living in rural areas. The relation between pollution & urbanization- Urbanization & pollution are intertwined with rapid urbanization often. Leading to increased pollution due to concentrated human activities, industrial growth and resource consumption, impacting air, water & soil quality. The relation between urbanization and environment – Urbanization not only destroys and fragments habitats but also alters the environment itself. For ex- Deforestation and fragmentation of forest lands lead to the degradation and loss of forest interior habitat as well creating forest.

Types of Pollution Due to Urbanization including microbiology insights:

1. Air pollution and microbial air quality

Sources: Vehicular emissions, industrial discharges, and construction activities. Effects: Increased levels of particulate matter (PM_{2.5}, PM₁₀), carbon monoxide, nitrogen oxides, and sulphur dioxide lead to respiratory issues and climate change.

Airborne microbes, including pathogens, increase due to poor air quality. Urban dust contains harmful bacteria and fungi that can cause allergies and infections. These particles often act as carriers for airborne pathogens such as *Mycobacterium tuberculosis* and *Legionella pneumophila*, which pose serious health risks. Impact on Respiratory Health: Changes in airborne microbial populations may exacerbate respiratory conditions, including asthma and chronic obstructive pulmonary disease (COPD).

2. Water Pollution and Pathogenic Microorganisms

Sources: Industrial effluents, domestic sewage, and improper waste disposal. Effects: Wastewater Contamination: contamination of water bodies reduces aquatic biodiversity

and impacts drinking water supplies. Urban runoff often carries untreated sewage into rivers and lakes, introducing pathogens like *Escherichia coli*, *Vibrio cholerae*, and *Cryptosporidium* into water bodies. Antibiotic Resistance: Effluents from hospitals and pharmaceutical industries release antibiotic residues into urban water systems, promoting the emergence of antibiotic-resistant bacteria (ARB). Harmful Algal Blooms (HABs): Nutrient pollution from urban fertilizers leads to algal blooms, which support the proliferation of toxin-producing microbes, such as *Microcystis* species. Microbiological Impact: Waterborne diseases like cholera, typhoid, and dysentery are caused by bacteria such as *Vibrio cholerae* and *Salmonella spp.* Urban wastewater promotes the growth of antibiotic-resistant microbes.

3. Soil Pollution and Microbial Imbalance

Sources: Disposal of non-biodegradable materials, chemical spills, and excessive use of fertilizers. Effects: Reduced soil fertility and contamination of food crops. Chemical Contaminants: Heavy metals, pesticides, and industrial chemicals degrade soil quality and disrupt beneficial microbial communities like nitrogen-fixing bacteria (*Rhizobium*), affecting agricultural productivity. Landfills and Methanogens: Urban waste accumulation in landfills promotes methane production by methanogenic archaea, contributing to greenhouse gas emissions. Microbiological Impact: Loss of beneficial soil microbes such as *Rhizobium* and *Mycorrhiza* affects nutrient cycling. Pathogenic microorganisms may proliferate, posing risks to human health.

4. Impact on Urban Ecosystems Microbiological Dimensions of Urban Pollution

Biodiversity Loss: Urbanization replaces natural habitats with concrete landscapes, reducing microbial diversity in soils and water. Disrupted Microbial Interactions: The reduction in microbial diversity hampers essential ecological functions such as decomposition, nutrient cycling, and detoxification. Emergence of Antibiotic Resistance: Urban wastewater and hospitals release antibiotic residues into the environment, promoting the spread of antibiotic-resistant bacteria (e.g., *Escherichia coli*, *Klebsiella pneumoniae*). Pathogen Proliferation: Warm urban environments and polluted water bodies provide ideal conditions for the growth of pathogenic microorganisms. Bioremediation: Microbes such as *Bacillus*, *Pseudomonas*, and *Mycobacterium* are used to degrade pollutants, offering a potential solution to urban pollution.

4. Solutions to Urban Pollution:

1. Urban Planning: Create green spaces to improve air quality and reduce the urban heat island effect
2. Waste Management: Implement proper segregation, recycling, and treatment of waste to minimize pollution.
3. Microbial Technology: Use microbial bioremediation to treat contaminated soil and water.

4. Bioremediation: Using microbes such as *Pseudomonas species* and *Mycorrhizae fungi* to degrade pollutants.
5. Biofilters: Developing microbial air and water filters to trap and neutralize pollutants.
6. Smart Urban Planning: Designing green spaces to enhance beneficial microbial communities and reduce pollutant levels.

Conclusion: Urbanization, while essential for economic growth, poses serious environmental challenges. Pollution affects not only the physical environment but also microbial ecosystems, leading to long-term consequences. Integrating sustainable practices and microbial technologies can mitigate these effects and ensure a balanced coexistence between urban development and the environment.

Author – Akash Joshi

T.Y. BSc.

17/02/2025



When Myths Come To Life....

Picture this...

It is a cold dark night. The fog has set heavy upon the dense Sri Lankan Forest that parts briefly, making just enough way for your path. The moon beams penetrate the thick canopy barely enough to light up your path. A lone weary traveller set upon your path, your ears are pricked for any minute movement, your eyes wide, rarely blinking, desperate to catch every small sliver of light. The forest is a dangerous place in the day itself, with animals as leopards and elephants posing a constant threat. but, the cover of night brings another threat, a much darker and more sinister threat. A threat that lies beyond the mortal plane itself. A shadow, said to lurk within the treetops that perhaps frightened the beasts of the woods themselves. The woods around you seem thick, dense, silent. You are all too familiar with the legends, the stories that elders told to make sure little children did not stray into the forests at night. Stories, in which the grief-stricken women wail in sorrow, her wails of despair still echoing in the forests, said to be omens of deep misfortune and death. The stories keep coming back to you, even though you know they cannot be true. Stories of spectres in woods heralding your death are just that, tall tales passed around by children around campfires. All these thoughts constantly ruminating in your head, you silently tread along the forest trail. Then, you hear what you have dreaded to hear all along, a long-drawn-out shriek, trailing off into the deep woods. You stop, frozen in place, your blood runs cold and your hair stands on end, your eyes fixed on the road ahead unable to look around in fear of encountering the source of the cry. All thought in the wind, you bolt along the path, never stopping for one second to look behind. You reach your destination, with your heart pounding and with a story to recount for many a year to come. A tale of the night you survived the dreaded Ulama.

Such stories were and still probably are still told in many parts of the country. Sri Lanka's dense forest and plethora of biodiversity did wonders to bolster the reputation of the forests as places where legends live on. For years the tale of the Ulama, or the Devil-Bird has been a part of folklore in Sri Lanka. Though the beginnings may differ, the story often ends

with a wronged woman being turned into a creature of the night. The story baffled ornithologists and researchers for many years. The sound, undeniable, was the topic of debate. Was there a plausible explanation for the cry? Did the legend in fact have any basis in reality? Many researchers were trying to attribute the sound to any of the many denizens of the jungle, and the list of possible suspects included many of the island's unique fauna, particularly the avian members. The question was finally answered in early 2000s, when ornithologists finally came to a conclusion. The fabled cry of the Ulama was attributed to the call of the Spot-bellied Eagle Owl. Its nocturnal habit, elusive and shy nature have fuelled this legend further, and its distinct dark heart shaped feathers set it apart from all the other possible avian suspects.

This is but one instance when a study into local folklore and Cryptozoology has led to an actual and significant biological discovery. Folklore and legends have sparked questions in the scientific community in similar ways since the 1800s. We find similar such stories from all over the world. The Moni people of Papua and New Guinea worshiped what they called "man of the forest", said to be the spirits of their ancestors. It is said that every elder that passed away returns as a spirit and watches over the village. The animal was later identified as a species of tree kangaroo in the 1994 and was named the *Bondegazou* after the native name for it. In the rainforests of Congo, local legends spoke of a forest guardian spirits that resembles man, yet has a giant stature and metallic appearance. It was said that it silenced the entire forest as it walked. In 1902, the mysterious spirits were known to the world and became to be known as one of the closest genetic relative of man, the Silverback Gorilla. tales spoke of giant monstrous dragons on the small islands of Indonesia that felled great beasts with but one drop of their saliva. As stories left the islands, the western world laughed at the idea of prehistoric monsters still roaming the earth, chalking up these stories to more tall tales woven by sailors on the high sea. Thought to be just legends, these monsters received scientific recognition in 1926 and are now known as Komodo Dragons, the largest monitor lizard species in the world. Stories floated from Egypt and Central Africa speaking of a creature known as the African Unicorn. It was said to bear features of various animals, and had baffled researchers for its elusive nature. The creature remained a myth, until 1901 when it was known to the world as the Okapi or the Forest Giraffe. Many other similar stories have occurred all over the world for many animals such as the Kia parrot from New Zealand, or the Vanunu Giant Rat, the list remains endless.

Cryptozoology is the study of animals that are yet to be proven scientifically, yet who's existence persists through multitude of stories and even eyewitness accounts. Some of the most famous animals under this study include the fabled Bigfoot, the Loch Ness Monster or the infamous Moth man. The term was coined officially in the mid-20th century by naturalists Bernard Heuvel Mans and Ivan T Sandersons. Most cryptozoological creatures

arise from Modern zoologists and researchers often distance themselves cryptozoology, as it often cites anecdotal evidences and historical accounts as evidence. Cryptozoologists and enthusiasts have been debunked several times as they often lack empirical evidences.

Since ancient times, humans have had stories where real-world nature is woven with mythology. Every culture in the world has supernatural animals that prove to be benevolent protectors or malevolent forces of chaos. These timeless tales come from ageless cultures. Centuries of oral traditions have moulded and shaped these stories, breathing life into fantastical creatures beyond imagination. And as most tribal communities are so intrinsically connected with nature, the stories that arise from them are a mesmerising intersection of mythology and natural history. These stories have nature and wildlife incorporated into them as deeply as it is involved in their day-to-day life. When such a tale tantalizes an adventure loving zoologist, it results in a ground breaking discovery. Often the legend may remain one, but the source of the legend serves to further enhance the science. These stories sit on a very delicate and fascinating convergence of natural history and human culture. Perhaps, even today, there are some legends and myths out into the deep wilderness waiting to be discovered by someone who follows the footsteps of our ancestors.....

Author – Anagha Vempaty

S.Y. BSc.

24/03/2025



Rivers – Who worries about their tears?

Water, something that is so precious but so uncared for. The neglect that our water bodies face today is horrible. We all know that we need water to live and yet, somehow, not many people seem to care about the water bodies and their conditions. The Mutha river, behind our college is in a horrific condition. Many excavations near the river have proved that this river has been the primary source of water for more than 1 lakh years. The city of Pune came to existence around the Mutha river. It would have been a gushing and raging river once, but today, it is reduced to a mere canal. As I travel through the Pune Metro every day, I get to observe the changes in the river every day.



The Mutha river, picture taken from Pune Metro Rail.

There are always huge amounts of plastic waste floating atop the river. The colour of the water looks so horrible, as if it were a garbage carrying canal. There is also a typical smell that the river has which only further tells us the state of the Mutha river. The banks of the river are filled with garbage and specifically plastic. Recently, thousands and thousands of dead fish were found in the Mutha river near Sangam wadi. The cause is thought to be untreated sewage water. The pathetic state of the aquatic organisms living in this river is of great concern. There seem to be no major industries on the banks of the river and yet, it is horribly polluted. Untreated sewage, throwing away garbage into the river and no supply of fresh water except in rainy season can be some of the many causes of this river's pollution. Untreated sewage is major problem as it might contain heavy metals and chemical effluents which cannot be cleaned easily.



The Mutha river during monsoon, picture taken from Pune Metro Rail

The river, however, comes to life in the monsoon. It gushes through and floods all the low-lying areas nearby as if it were angry that it wasn't allowed to flow like this all the time. Although many NGOs and organizations along with Pune Municipal Corporation work for the better state of the river, it still is in a horrible condition and needs a lot more effort from the citizens of Pune. Not tossing garbage into the river, just this one step, will be of great help to the river's condition. Our precious rivers, the source of our lives should be loved and nurtured for by us. Cleaning and maintaining them is our duty and it is the least we can do to pay back to them.

Author - Aryan Apte

T.Y. BSc.

18/03/2025



The Paris Agreement

“Successes & Challenges”

“The air burdened with heat, an unnatural warmth that clung to the small coastal town even as the sun dipped down the horizon. A local fisherman’s boy stood at the edge of what used to be his grandfather’s patio now engulfed by rising tide. The boy stood overwhelmed by the thought that the world has changed. The summers were scorching, the storms fiercer and seasons uncertain. Across the realm, from parched farmlands to drowned streets, people were taken aback by the unsettling truth – “The Climate Change Is No Longer A Distant Threat” but knocking on doors reshaping our lives in ways never imagined.

A remarkable and important international treaty was adopted in 2015 to combat the global threat of climate unpredictability. Signed by 196 countries under the United Nations Framework Convention on Climate Change [UNFCCC], it aims to limit the global warming at a threshold of under 2°C above pre-industrial levels while the ambition to keep it under 1.5°C.

While the project being, “As Golden as the Midas’ Touch”,

It faces a mountain of challenges whilst constructing a concrete foundation for sustainable living for generations afar. This article analyses and examines the highlight and Obstacles of The Paris Agreement.

Unlike the ‘Kyoto Agreement’ which saw the participation of only developed nations, the Paris Agreement embraced both the developing as well as developed nations. Thus, recognising the shared responsibility. Major economies Like Japan, China and European Unions have set their eyes on achieving net-zero emissions showcasing a coalited approach for addressing climate change.

The Paris agreement has encouraged realms around the globe towards development and transfer of technology for reduction of greenhouse gaseous emissions. This focus has accelerated innovation in ways to tackle renewable energy and climate-resilient technology.

Since the endorsement of the treaty though delayed, the target to increase climate finance was achieved in 2022, helping the fund green infrastructure and disaster resilience initiatives.

Despite the combined efforts of the unions, the global greenhouse gas emissions continue to rise. Current national pledges are inadequate to meet the Agreement's goal of warming under 2°C but instead threatening a temperature rise exceeding 3°C. Moreover, the delay in achieving climate finance in 2022 showed unstable financial commitments.

On 20th of February, 2025 Mr. Donald Trump, the president of United States signed an executive order to withdraw from the agreement. Apart from being the second largest superpower, The United States is held accountable for being second-largest emitter after China. This move has raised eyebrows about global unity in combating climate change.

“The reality of climate change is unfolding before our eyes affecting communities and generations to come. The choices we make today will determine the world we leave behind. The fight against climate change is not just about protecting the planet; it’s about securing the future for all. While the global initiatives like the Paris agreement aim to curb these problems, urgent action is needed at all levels to mitigate the crisis and adapt to the changing world”

Author - Bela Ratanjankar

S.Y. BSc.

22/03/2025



Conservation: Need of today

Environment, our environment encompasses the interaction of all living species, climate, weather and natural resources that affect human survival and economic activity. It is a complex system where biotic and abiotic components are interconnected and influence each other. The well-being of these components is important for a sustainable future. Hence it is our duty to protect and enrich these resources to ensure that our earth survives till the end of time.

Conservation is the study of the loss of earth's biological diversity and the ways the loss can be prevented. It seeks to protect life's variety at levels of biological organisation. Wildlife conservation is the practice of protecting wild plant and animal species and their habitat. It holds significance as wildlife is essential in balancing the ecosystem and stabilising different natural processes. All the taxa are under threat of extinction due to various actions of humans. These actions are causing irreversible damage to the earth like global warming, extreme climate fluctuations, pollution, uncontrollable amount of waste and garbage, removal of potable water, etc.

Day by day more and more species of animals and plants are on the verge of extinction and many have even become extinct. The impact of this is seen in not only the region where the animal is extinct but all over the world. But we as humans are least bothered by this as we are still continuing to ruthlessly chop down trees, clearing every field with trees, breaking each and every hill till its core.

These are quotes of some of famous conservationists which clearly paint the picture of our current situation:

- 'If we do not do something to help these creatures, we make a mockery of the whole concept of justice -Jane Goodall '
- Crocodiles are easy. They try to kill and eat you. People are harder. Sometimes they pretend to be your friend first.

We don't own the planet earth; we belong to it. And we must

share it with our wildlife. - Steve Irwin

- The future belongs to nations with grains and not guns. If agriculture goes wrong nothing else will have a chance to go right. - M. S. Swaminathan
- I care to live only to entice people to look at nature's loveliness. - John Muir

Ninety nine percent of all species that have ever lived have gone extinct over the course of five mass extinctions, which, in the past, were largely a result of natural causes. Today the rate of extinction is 1000 to 10000 times faster because of human activity. The threats to species are pervasive plastic pollution in the ocean - a recent study found that almost 100 percent of sea turtles had plastic or microplastics in their systems.

What we do not understand is the implications the loss of even one species can cause, but it matters as all species are connected through their interactions in the food web. Each species plays an important role in the ecosystem. A recent study (by Flinders University) found that extreme environmental change could trigger an extinction domino effect. One of the authors of the study Dr Giovanni Strona said, "Because all species are connected in the web of life, our paper demonstrates that even the most tolerant species ultimately succumb to extinction when the less tolerant species on which they depend disappear". So it shows that saving even one species means saving other species and in turn the whole habitat.

If all the animals became extinct from the earth the earth's ecosystems would collapse, there would be plant extinction as many plants rely on animals for pollination and seed dispersal. It will impact bio-chemical cycles, climate changes. Soil health will deteriorate which will all eventually lead to extinction of humans. So it is our responsibility to ensure that we stop this cascade of events which have destruction written all over them. It is in our hands to fulfil the need of today that is conservation and make the world a greener place.

Author - Disha Jain

T.Y. BSc.

16/03/2025



Bioluminescent Forests: Nature's Hidden Glow

In rare forests around the world, the night comes alive with an otherworldly glow. Certain fungi, bacteria, and even plants produce bioluminescence, a natural phenomenon where organisms emit light through chemical reactions. This eerie, bluish-green glow can be seen on tree trunks, fallen leaves, and decaying wood, creating a breathtaking spectacle in the darkness.



Figure: Bioluminescent forests of India

Some of the most well-known bioluminescent forests exist in India's Western Ghats, Brazil's Atlantic Forest, Japan's Wakayama Prefecture, and the Great Smoky Mountains in the USA. These ecosystems host glowing fungi like *Mycenae chlorophos* and *Neonothopanus gardneri*, which thrive in humid conditions and shine brightest at night. Their glow attracts insects that help spread fungal spores, ensuring their survival and growth.

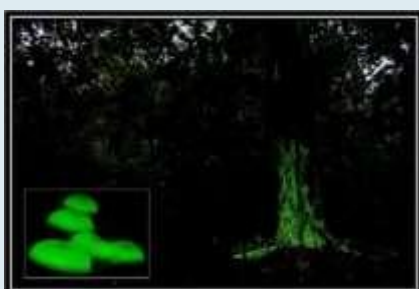


Figure: *Mycenae chlorophos* glowing on Banyan tree

Beyond their beauty, bioluminescent organisms play a crucial ecological role. They aid in decomposition, breaking down organic matter and recycling nutrients back into the soil. Some bacteria glow as a form of defence, while certain fungi use their light to attract insects for spore dispersal. These glowing interactions help maintain the delicate balance of forest ecosystems.

Despite their importance, these glowing forests face increasing threats from deforestation, climate change, and over-tourism. Habitat destruction reduces the presence of bioluminescent fungi, while rising temperatures and humidity shifts disrupt their natural cycles. Additionally, human interference, such as excessive artificial lighting, can alter the natural behaviour of these organisms.

Interestingly, scientists are now exploring ways to harness bioluminescence for sustainable lighting solutions. Researchers have begun experimenting with bioluminescent plants and trees that could one day replace streetlights, reducing energy consumption. As these mysterious forests face uncertainty, conservation efforts and scientific innovations could ensure that nature's glow continues to shine for future generations.



Figure (a), (b), (c) - Bioluminescent Flora and Fauna around the world

Author - Grishma Purant

S.Y. BSc

22/03/2025



THE BUZZ BENEATH: INSIDE THE WORLD OF BEES

Bees, with their busy buzzing around flowers, might seem like just another insect in nature's grand design. But these tiny creatures play a role far bigger than most people realize. Bees are essential pollinators, which means they help plants reproduce by carrying pollen from one flower to another. Without them, many plants, including the ones we rely on for food, wouldn't be able to grow. In fact, bees are responsible for pollinating about **75% of the food crops we eat**, including fruits, vegetables, and nuts.

At the heart of a bee's world is the **honeybee colony**—a highly organized society. In each colony, there are thousands of worker bees, a few male drones, and one queen. Every bee has a specific job. The queen's only job is to lay eggs and ensure the hive grows. The male drones are there to mate with the queen. But it's the female worker bees that do all the heavy lifting—they gather food, protect the hive, and even help care for the young.

One of the most amazing things about bees is how they **communicate**. When a worker bee finds a good source of food, she doesn't just keep it to herself. Instead, she returns to the hive and performs a unique dance known as the "**waggle dance**." This isn't just any dance—it's a coded message. The direction and length of the dance tell the other bees exactly where to find the flowers. It's like giving directions using only body movements. This incredible ability to communicate allows bees to efficiently gather nectar and pollen, which they use to make honey and feed the hive.

But bees do more than just make honey. They are considered **keystone species**, which means they play a critical role in their ecosystems. By pollinating plants, bees help maintain biodiversity—the variety of life in an environment. Many plants rely on bees to produce seeds and fruit. Without bees, many plants would fail to reproduce, which could lead to a decline in the species that depend on those plants for food.

Unfortunately, bees are facing some serious threats. One of the biggest issues is **Colony Collapse Disorder (CCD)**, a phenomenon where entire bee colonies suddenly disappear. This problem has been linked to several factors, including the use of certain pesticides called **neonicotinoids**, which harm bees' nervous systems. Habitat loss, climate change, and the spread of diseases and parasites are also contributing to the decline of bee populations around the world.

The decline in bee numbers is alarming because it doesn't just affect bees—it affects us, too. Without bees to pollinate crops, we would lose many of the foods we depend on. In fact, scientists estimate that the economic value of pollination services provided by bees is

in the billions of dollars each year. Losing bees would create a serious problem for global food production.

Thankfully, there are ways we can help. Farmers are turning to **organic farming** practices that reduce the use of harmful chemicals. Urban areas are also becoming more bee-friendly by planting gardens with native plants that attract bees. And awareness about the importance of bees is growing, with more people starting to appreciate how vital these little pollinators are to our ecosystem.

Bees may be small, but they have a big impact on our world. Their intricate communication, their role in supporting plant life, and their essential place in agriculture make them one of nature's most important creatures. Protecting them is not just about saving an insect—it's about ensuring the future of our food, our biodiversity, and the health of our planet.

In a world where environmental challenges continue to grow, bees remind us that even the smallest creatures can have the biggest influence on our lives. It's up to us to protect them and the incredible ecosystems they support.

Author - Himanshu Thorat

T.Y. BSc.

15/03/2025



Per Aspera Ad Magnitudinem

"Through Hardships to Greatness"

Mastery in a craft earns recognition, but those who excel in many leave a legacy

We are taught to think that we have to choose. In the struggle for excellence, we have to give up everything else. If we are to be considered as serious academics, we cannot be athletes. If we dedicate ourselves to art, we cannot be part of research grounded in reality. But I have never believed that. I never thought that passion has to be or needs to be compartmentalised into neat, single files. For me, strength is not about deciding between roads but in traveling them all to emerge enlightened.

As I climbed on the platform at the Asian Open Junior Powerlifting Championship, lifting against some of the world's best, I was not merely lifting weights but carrying years of discipline, training, failures and victories. Beating Kazakhstan and placing second to Japan was more than a podium placement—it was a testament to endurance, to strategy, to knowing precisely when to surge and when to pace. The same precision and control characterise my practice in biology. In science, similar to a sport, victory is in the details. One wrong move, one missed digit, and the whole thing falls apart. Strength is not only physical—it is mental; it is the capacity to remain calm under duress, to have faith in the process even when the outcomes are foreign to us.

Music also requires that same equilibrium of creativity and constraint. When I was working on Jurassic World: Dominion at Universal Studios, I witnessed firsthand how one composition can inform the entire emotional tone of a scene. Subsequently, at DreamWorks Animation, on Kung Fu Panda 4, The Bad Guys, and Camp Cretaceous, I discovered that in film scoring, timing is everything. Too early or too late by a fraction of a second, and that moment is gone. Working with some of the best in the business, I was involved in designing the subtle musical cues that propel a film's tension, pacing, and depth. The Tomorrow War on Amazon Prime Video was a completely different challenge— its soundtrack needed to

convey the magnitude of war with the vulnerability of survival. Producing under strict time-lines, revising compositions based on directorial input, and making sure that each note counted for something taught me that precision is not exclusive to the lab or gym but is what breaks or makes the very art of storytelling.

Science, sports, and music superficially are about as different as these activities can be. But to me, they are synonymous with one another. All three demand discipline, flexibility, and a commitment to accept failure as a stepping stone along the road to mastery. All three require you to give it everything you have, yet be fluid enough to adjust when conditions shift. They do not borrow from one another. They complement each other.

I am always asked how I do it all—how I oscillate between academics and training, from composing music to calculating concentrations. The answer is that I don't treat them as distinct disciplines but rather as aspects of the same pursuit: the incessant drive to push past boundaries.

And so, to each of you who has ever torn their heart between several passions, who has been told to choose—don't. Don't shrink yourself to meet other people's expectations. Don't give up on a dream to pursue another. If you truly love something, create time for it, commit to it and fight wholeheartedly for it so that you can live to see what you have built and for it to stand as a testament to your sacrifices.

"You don't become great by choosing between passion and purpose but by forging a life when neither has to be sacrificed".

Author – Jay Babar-Patil
S.Y. BSc.
25/03/2025



Social Structure in Animal Kingdom:

FROM ANT COLONIES TO ELEPHANT HERDS

We all know and experience the vast social structure in our day-to-day life. These structures are hierarchical in nature. Similar to human or we can say in a much more organized manner the animal kingdom shows fascinating social structures that help species survive, reproduce and thrive in their environments. From highly organized ant colonies to the complex family bonds of the elephant herds, animals exhibit a wide range of social behaviors. These structures are shaped by evolution, ecological pressures and need for cooperation.

1)Bee Hives: A Highly Organized Society

Honey bees live in highly structured colonies where individuals perform specific duties:

Queen Bee: Queen bee is the only reproductive female of the hive capable of laying thousands of eggs and also controlling the hive.

Worker Bees: They are sterile females which perform all kinds of duties like gathering nectar, producing honey, maintaining the hive, taking care of the young bees, etc.

Drone Bees: These are males which mate with the female and die soon after.

Bees communicate with the help of various dances like the tail wagging dance, round dance etc. Their social system enables hive survival and efficient resource collection.

2)Elephant Herds: Strong Family Bonds -

Elephants exhibit one of the most advanced social structures among mammals. They live in matriarchal herds where the oldest and experienced female leads. The herd consists of

Matriarch: The leader who guides the group based on her knowledge of food, water source, migration routes and dangers.

Adult Females: Mothers and aunts who care for calves and support the herd.

Young Elephants: These are calves that learn survival skills from older members.

Once males reach their adolescence leave the herd to live in small bachelor groups or solitary individuals. Elephants are known for their deep emotional connections, showing joy grief and cooperation and use vocalization, body language and even touch to communicate.

3) **Wolf Packs: Hierarchical Leadership**

Wolves live in tight knit packs led by an Alpha Pair (dominant male and female) which are typically the only members to reproduce. The packs social hierarchy includes:

Beta wolves: Second in command, often taking on leadership when needed.

Subordinate wolves: These contribute to hunting and pack activities but with lower social ranks.

Omega wolves: The lowest ranking members, often playing a role in reducing pack tensions.

Pack cooperation is important for raising young ones, hunting larger animals and defending territory. Wolves use scent markings, body language to communicate and maintain their social order.

4) **Ant Colonies: The Ultimate Social System**

Ants are one of the best examples of eusociality, the highest level of social organization in animal world. An ant colony functions like a single organism, where individuals play specialized roles.

Queen: The queen is the reproductive leader of the colony, responsible for laying eggs.

Workers: Sterile female ants that perform tasks like foraging, nest maintenance, and caring for larvae.

Soldiers: Soldiers are larger workers that defend the colony from threats.

Drones: These are male ants whose sole purpose is to mate with the queen.

Social structures in the animal kingdom range from rigid caste- based systems in insects to dynamic intelligence driven systems in mammals. These structures help animals to protect themselves, hunt efficiently and pass down survival knowledge. Studying these social structures provides insights into human social behaviors and evolution.

Author - Kaushik Karandikar

T.Y. BSc.

20/03/2025



Research Project Paper – Effect of Tianeptine on Chick Embryo

Title: Teratogenic, biochemical and anti-angiogenic effects of an atypical antidepressant Tianeptine on chick embryo.

Authors: Pinakin Shrikant Wagh, Kaushik Kumar Karandikar, Atharva Milan Mulye * and Tanmay Abhijit Kadle

Article DOI: <https://doi.org/10.30574/wjbphs.2025.21.3.0240>

Abstract:

Tianeptine is an atypical antidepressant used to treat disorders like Major Depressive Disorder (MDD), anxiety, Parkinson's disease, Post-Traumatic Stress Disorder (PTSD), erectile dysfunction, asthma, and *Irritable Bowel Syndrome* (IBS). Tianeptine is not globally accepted in the treatment of MDD and anxiety as some countries have restricted its prescription or have revised the warning labels and stated its abuse potential. The aim of this study was to assess the potential teratogenic effect of Tianeptine on developing 3–4-day old *Gallus gallus domesticus* embryos. Treated embryos were divided into two groups based on dosage viz. 10ppm and 100ppm Tianeptine. The results of our study showed that Tianeptine induces mild to severe teratogenesis for the selected doses. Embryos treated with Tianeptine showed teratogenic defects like neural tube defects (NTDs), abnormal neurogenesis, anomalous lumbar flexure and torsion, formation of haematomas and ophthalmic defects. Tianeptine treatment also negatively affected angiogenesis by decreasing the vessel density, total vessel network length, total segments and total branching points of the blood vessels on the Yolk-sac membrane (YSM). Biochemical studies showed that Tianeptine treatment increased the total protein content, increased the Acetylcholinesterase (AChE) level and decreased the Alkaline Phosphatase (ALP) level in the treated embryos. This study sheds light on the potential detrimental effects Tianeptine may have on other embryonic models.

More studies on atypical antidepressants like Tianeptine need to be carried out to assess its impact on embryonic development and developmentally regulated gene expression.

Keywords: Tianeptine; Atypical Antidepressant; Teratogenesis; Chick embryo; Yolk-sac membrane (YSM); Acetylcholinesterase (AChE); Alkaline Phosphatase (ALP)

Materials and methods:

Fertilized and pre-incubated eggs of 72hrs (HH 20-21) of *Gallus gallus domesticus* (White- Leghorn strain) were procured from Venkateshwara Hatcheries Pvt Ltd Pune. Eggs were cleaned with 70% ethanol, labelled and incubated in a BOD incubator (REMI®) at 37.5 °C at 70-80% relative humidity (Rh). Working solution of Tianeptine (Stablon™, Servier India Pvt. Ltd.) of concentrations 10ppm (22.9µM) and 100ppm (229µM) were prepared using the stock solution and filter sterilized (0.22micron pore size, 25mm diameter) before treatment. Treated and control embryos were harvested in chilled sterile 1X PBS and used for evaluation of teratogenesis and biochemical analysis. Images of the YSM vasculature of control and treated embryos were analysed using WimCAM software (Wimasis).

Results:

Teratogenesis and embryonic malformations: Our study showed that Tianeptine induces teratogenic defects in 3–4-day old (HH stage 20-21) *Gallus gallus domesticus* embryos for the selected doses. The embryos exhibited developmental anomalies, including neural tube defects (NTDs) alterations in neuromere morphogenesis, craniofacial abnormalities, haematoma in the heart, compression of antero-posterior axis, abnormal torsion and flexure throughout the embryonic axis, ophthalmic defects like absence of pigmentation, deformed lens and optic cup.

Degeneration of YSM vasculature: Tianeptine treatment resulted in severe degeneration in the vessel density, total vessel network length, total branching points and total segments of the blood vessels on the YSM of 3–4-day old chick embryos as revealed by analysis using WimCAM software.

Biochemical studies revealed that Tianeptine treatment altered the total protein content and AChE and ALP levels of treated embryos as compared to control embryos. Total protein content was found to be increased in Tianeptine treated embryos (10 ppm: 19.6µg/ml and 100 ppm: 24.56µg/ml) as compared to control embryos (12.6 µg/ml). Alkaline phosphatase levels in the control embryo were 133.02 IU/L and they were found to be reduced in the treated embryos (10 ppm: 89.25 IU/L and 100 ppm: 82.41 IU/L). Tianeptine treated embryos showed an increase in Acetylcholinesterase levels at 10ppm: 178 IU/L but the concentration

did not increase significantly in 100 ppm:179 IU/L while the level in the control embryo was 105 IU/L.

Conclusion:

The consensus of this study was that Tianeptide induces teratogenic defects in early- stage (3-4 day old) chick embryos. The embryos treated with Tianeptide showed alterations in neuromorphogenesis, ophthalmic defects, abnormal torsion and flexure of the embryonic axis and degeneration of the YSM vasculature as seen by reduced vessel density, total vessel network length, total segments and total branching points. The treated embryos showed elevated total protein content and Acetylcholinesterase (AChE) levels while Alkaline phosphatase (ALP) levels were found to be decreased as compared with control embryos. More studies need to be done to understand the effect of Tianeptide on developmentally regulated gene expression and its interactions with neurotransmitters and their receptors in the Central Nervous System (CNS).

The authors strongly recommend that all the readers refer to the original article to get a better sense of the scope of the research that they have done.

The article is available from: <https://doi.org/10.30574/wjbphs.2025.21.3.0240>

Author - Nupur Vaidya

T.Y. BSc.

19/03/2025



The Environmental Impact of Fast Fashion in India: A Growing Crisis

India, a global textile powerhouse, faces a paradox: Its booming fast fashion industry fuels economic growth while wreaking havoc on the environment. As global brands out-source production to Indian Hubs like Tirupur, Surat and Ludhiana, the environmental costs - water scarcity, toxic pollution, and waste escalate.

Effects:

- India is the world's largest cotton producer, but conventional cotton farming guzzles water - **22,500 litres per kilogram of cotton**, exacerbating drought in states like Maharashtra and Punjab. The textile wet - processing industry, including dyeing and finishing, consumes **1.6 trillion litres of water annually**, straining rivers.
- Textile dyeing, reliant on carcinogenic chemicals like azo dyes and heavy metals, contaminates India's waterways. The Yamuna and Ganga Rivers, already choked with industrial waste, absorb untreated effluents from clusters in Kanpur and Delhi. In Surat, Gujarat textile effluents have turned the Sabarmati River acidic, destroying aquatic life and rendering water unfit for irrigation. A 2021 CPCB report found **70% of India's surface water is polluted**, with textiles contributing significantly.
- Fast fashion's disposable culture generates **8.5 million tons of textile waste annually** in India. Landfills in Delhi (Bhalswa) and Mumbai (Deonar) overflow with non - biodegradable garments, often incinerated, releasing toxins like dioxins. While India's informal sector recycled 60% of waste, the influx of cheap, low - quality fast fashion overwhelms systems, leaving 40% to rot or burn.
- India's textile industry accounts for 2% of national GHG emissions, driven by coal-powered factories and long - haul transportation. States like Tamil Nadu, home to

spinning mills, face dual burdens: air pollution from coal and CO2 emissions from global garment exports.



(a)



(b)



(c)

Figures (a), (b), (c): Environmental Pollution Caused by Fast Fashion

Solutions:

- **Policy Interventions:** The CPCB mandates Zero Liquid Discharge for Dyeing Units, but enforcement remains lax. Stricter penalties and incentives for eco-friendly technologies are critical.
- **Sustainable Materials:** Projects like **organic cotton farming** in Odisha and hemp fabric startups in Karnataka reduce water and chemical use.
- **Circular Economy:** Brands like *Doodlage* and *Upasana* champion upcycled fashion, while thrift platforms like *Bombay Closet Cleanse* gain urban traction.
- **Consumer Awareness:** Campaigns like *Fashion Revolution India* push for transparency, urging buyers to *#WhoMadeMyClothes*.

India's fast fashion sector stands at a crossroads. While it employs 45 million people, unchecked growth risks irreversible environmental damage. By integrating traditional wisdom (e.g., handloom's low-carbon footprint) with innovation, India can lead a sustainable textile revolution.

The choice is clear: prioritize people and planet over profit, or let fast fashion drown the nation in waste and toxicity.

Author - Rohan Ade

S.Y. BSC.

14/03/2025



PROTECTING OUR ENVIRONMENT: A SHARED RESPONSIBILITY

The environment is the foundation of life, but human activities are causing its rapid degradation. If we do not take action, the consequences will be severe. Environment provides us with the air we breathe, the water we drink, and food we eat. However, due to human activities, the environment is facing severe threats such as pollution, deforestation, climate change, and loss of biodiversity. If we do not take urgent action, the consequences will be devastating for both nature and future generations.

Major Environment Issues:

Pollution

Pollution is one of the most pressing environmental concerns. Air pollution, caused by industries and vehicles, leads to respiratory diseases and global warming. Water pollution from industrial waste and plastic dumping harms aquatic life. Soil pollution, mainly due to excessive use of chemicals in farming, affects food production and human health.

Deforestation

Forests are being cut down at an alarming rate to make space for agriculture, urbanization, and industries. This results in the loss of wildlife habitats, reduces oxygen levels, and increases carbon dioxide, contributing to climate change.

Climate Change

Global temperature is rising due to the excessive release of greenhouse gases. This leads to extreme weather conditions such as heatwaves, floods, and storms. Melting ice caps and rising sea levels also threaten coastal areas and biodiversity.

Loss of biodiversity

Many species are becoming extinct due to habitat destruction, pollution, and climate change. The loss of biodiversity disrupts ecosystems, which are essential for maintaining the balance of nature.

Steps to Protect the Environment

Protecting the environment is not just the responsibility of governments and organizations-it is a duty that each individual must take seriously. Here are some simple yet effective ways can contribute:

Reduce, Reuse, and Recycle: Avoid using plastic products, recycle waste materials, and reuse items whenever possible.

Plant More Trees: Trees help reduce air pollution, provide oxygen, and maintain ecological balance.

Save Water and Energy: Turn off lights and taps when not in use, and opt for renewable energy sources like solar and wind power.

Use Eco-Friendly Transportation: Walk, cycle, or use public transport to reduce carbon emissions.

Spread Awareness: Educate others about environmental conservation and encourage sustainable practices.

Conclusion

A clean and green environment is essential for a healthy and sustainable future. It is our collective responsibility to take care of nature and adopt eco-friendly practices. Every small effort count, and together, we can make a significant difference in protecting our planet for generations to come.

Author - Rutuja Arun Kute

S.Y. BSc.

22/03/2025



MENSTRUAL WASTE MANAGEMENT

Menstrual waste is nothing but the waste created by women during her menstruation (periods). This waste primarily includes menstrual hygiene products. In this modern era of commerce and mass consumption, purchasing decision regarding menstrual products is influenced by cost, availability of product, cheapness, duration of wear, ease to use, comfort, reliability, majorly by the attractive advertisements, etc. The world bank estimation states that around 500 million women lack access to education of menstrual cycle and lack of access to menstruation products and management of menstrual cycle.

The sanitary napkin market size in India is reached up to 825.3 million in year 2024. Almost 98% of menstrual hygiene products are of single use. In May 2023, the World Health Assembly adopted a resolution on the impact of chemicals, waste and pollution on health, to end plastic pollution, expressing concern that the production, consumption, and disposal of plastic products, including microplastics and related chemicals, which can be released in environment, may potentially impact human, plant and animal health as well as environment directly or indirectly. (WHA76.17. Agenda item16.3.0). Approx. 121 million Indian women use sanitary napkins, which creates 113,000 tons of waste annually. Almost 98% of sanitary napkins which are in use today takes almost 500-600 years for degradation as plastic is used in their manufacturing, resulting in increase in soil pollution and apparently resulting in global warming. In some cases the pads and tampons are flushed which cause sewage back-flow and blocking because these products have high water absorbing property.

To overcome the environmental impact of sanitary products we have to promote reusable sanitary hygiene products like **reusable pads, cotton pads, cloth pads, menstrual cup, etc.** Women have to start using biodegradable, environment friendly and eco-friendly products.

To solve this problem Ajinkya Dhariya from Pune, started a company named as **Pad Care**. I think this is a revolutionary startup. They collect all used pads, process them which differentiate that waste into plastic material and cotton, they process these products, i.e. plastic and cotton and resell it to the big companies which can reuse it. The Ministry of health and family Welfare released a draft menstrual health and hygiene policy, emphasizing biodegradable products and the implementation of SWM rules, as well as urging manufacturers to support waste management systems.

Author - Satish N. Pawar

S.Y. BSc.

19/03/2025



From Beach Trash to Global Crisis: Tackling Plastic Pollution

Last summer, I took a trip to *Alibaug* beach, expecting a relaxing day by the ocean. Instead, I was greeted by a shocking sight: the sandy shore was covered with plastic bottles, bags, and tangled bits of trash. It was hard to enjoy the scenery with all that litter ruining the view. That moment hit me hard and made me realize just how serious the problem of plastic pollution has become.

Plastic pollution happens when plastic stuff builds up in our environment, hurting animals, nature, and even us. Every year, millions of tons of plastic end up in the oceans—imagine a garbage truck unloading plastic into the sea every minute! Experts say that if we don't act, there could be more plastic than fish in the ocean by 2050. Sea creatures like turtles and birds are dying because they eat plastic or get caught in it. Plus, tiny plastic bits are showing up in our food and water, which could affect our health too.

Most of this mess comes from single-use plastics—things like straws, coffee cups, and shopping bags that we use once and toss. Poor waste management makes it worse. But we can fight back, and it starts with small changes. I've started carrying a reusable water bottle and saying no to plastic straws. It's easy to join clean-up drives too, like ones at the beach, to help out locally.

Our college and department can step up as well. What if we kicked off a “Plastic-Free Week” to get everyone thinking about this? We could swap out plastic forks and spoons in the cafeteria for compostable ones or add more water fountains so we don't need bottled water. Teaching students about sustainability could spark bigger changes. It'd be awesome to see our department lead the way in going green.

On a bigger scale, new ideas like biodegradable plastics or projects to clean up the oceans are popping up. But the real fix is stopping plastic waste before it starts—governments and companies need to ditch single-use plastics and push for better options.

Plastic pollution is a huge problem, from our beaches to the deepest oceans. But we're not helpless. By making smart choices ourselves and pushing our college to do more, we can make a dent in this crisis. Let's take it seriously—this e-magazine will stick around for a while, and I'd love for us to look back and see we started something good for the environment.

Author - Saumitra P. Patankar

T.Y. BSc.

19/02/2025



EFFECTS OF RADIOACTIVE MATTER ON THE ENVIRONMENT

Radioactive contamination causes serious effects on the environment which affects the ecosystem, wildlife and human population. Radioactive contamination is caused by improper waste disposal, disposal of nuclear waste without neutralising it, explosives, mines, etc. The severity of this depends on the factors like type of radiation, exposure to it and the affected surroundings around it.

Here are some key effects:

Soil contamination is caused by the improper waste management, army expeditions, etc. This causes the soil to become infertile and the effects remain for generations. The infertile land is left barren and further not used for agricultural purposes. Microorganisms do not survive due to the harmful radiation. Plants do not grow.

Water contamination is caused as the harmful radioactive substances can dissolve into the water and contaminate all water bodies around it. This ultimately results in the death of marine life. Rivers, lakes, ponds are key components of a water ecosystem which hold most of the biotic elements. Due to this contamination the ecosystem is disturbed completely.

Plants and trees are exposed to most of the radiation which are present around nuclear plants. The gases released are mixed with air and cause problems to plants and trees such as slow growth, less oxygen formation, mutations, etc. Forests near Chernobyl, for example, experienced “Red Forest syndrome”, where trees died due to over exposure.

Radiation can cause genetic mutations, birth defects, and reduced survival rates in animals. Some animals develop cancer or weakened immune systems, making them vulnerable to diseases. Predators consume the prey which is already affected and cause their bodies to accumulate radiation which is known as bioaccumulation.

Human health risks involve radiation sickness, cancer and genetic mutations. The direct exposure of radioactive material has long term effects on the human beings. Increased risks like leukaemia are prevalent.

CONCLUSION

Radioactive contamination harms the environment by polluting soil, water, and air. It affects plant growth, causes mutations and diseases in animals, and poses serious health risks to humans, including cancer. Nuclear accidents like Chernobyl and Fukushima have shown long-lasting ecological damage, with radiation persisting for decades. Contaminated ecosystems suffer biodiversity loss, and radiation can spread through the food chain.

Author - Shubham Khadsare

T.Y. BSc.

20/03/2025



Earth's Environment and the Future of Space: A Delicate Balance



Imagine a future. Space exploration is common. But Earth is struggling. Our home faces big problems now. These challenges affect space plans. We must act.

This article connects Earth's environment with space exploration's future. It shows why we need sustainable ways to explore space. It's about protecting Earth while reaching for the stars.

The State of Earth's Environment: A Pressing Concern

Earth is in trouble. Pollution and climate change threaten its future. This affects our ability to explore space long-term. We need a healthy planet to support space programs. The Earth's environment is in critical condition, requiring immediate and sustained action to reverse damage. While solutions on Earth remain the primary focus, space exploration holds promise for long-term sustainability. The balance between preserving our planet and looking beyond it for resources and habitation is crucial in ensuring the survival of humanity and the health of our ecosystem. Addressing the environmental crisis today will determine the quality of life for future generations, both on Earth and beyond.

Climate Change: The Overarching Threat

Greenhouse gases trap heat. This warms the Earth. Extreme weather, like floods and droughts, are becoming common. The IPCC reports show how fast the planet is warming. Sea levels are rising, too. These issues are a big deal. Climate change stands as the defining environmental challenge of our era. It influences every aspect of our planet, from rising global temperatures to extreme weather patterns, melting ice caps, and loss of biodiversity.

The effects of climate change are far-reaching, impacting not only ecosystems but also human societies, economies, and future endeavours, including space exploration.

The Environmental Crisis

The most apparent consequences of climate change include:

- **Rising Temperatures:** Global temperatures have risen significantly over the past century due to greenhouse gas emissions from human activities such as fossil fuel combustion, deforestation, and industrial processes.
- **Extreme Weather Events:** Hurricanes, wildfires, heatwaves, and droughts have become more frequent and severe, disrupting ecosystems and human settlements.
- **Rising Sea Levels:** Melting glaciers and thermal expansion of seawater contribute to the rise in sea levels, threatening coastal cities and island nations.
- **Biodiversity Loss:** Many species struggle to adapt to rapid climate shifts, leading to habitat destruction, species extinction, and disruptions in ecological balance.

Human and Societal Impacts

The consequences of climate change are not confined to nature; they extend into human society and well-being. Food security is at risk as unpredictable weather patterns affect crop yields. Water scarcity is an increasing concern, particularly in arid regions. Climate-related disasters displace populations, fuelling conflicts and economic instability worldwide.

The Role of Technology and Space Exploration

Addressing climate change requires a combination of policy action, scientific advancements, and technological innovation. Space technology plays a crucial role in climate monitoring and mitigation efforts:



Satellite Surveillance: Space agencies like NASA and ESA deploy satellites to track global temperature changes, deforestation, and ice cap melting, providing invaluable data for climate models.

- **Carbon Capture and Geoengineering:** Emerging technologies seek to remove excess carbon dioxide from the atmosphere and explore climate engineering strategies to mitigate warming.

- **Sustainable Space Exploration:** As humanity ventures further into space, it is essential to apply sustainable practices in off-world colonization. Learning from Earth's environmental challenges, space agencies prioritize renewable energy, closed-loop life support systems, and efficient resource management.

The Future: Adapting and Innovating

As we look ahead, mitigating climate change requires immediate global cooperation, investment in renewable energy, and sustainable practices. While Earth remains our home, future space exploration and potential colonization of other planets must integrate lessons from environmental conservation. A sustainable future, both on Earth and beyond, hinges on our ability to address the climate crisis today.

- **Colonization of Other Planets:** Mars and the Moon are potential sites for human colonization, reducing population pressures on Earth. **The Best Planet for Human Colonization.**

- As humanity advances in space exploration, the idea of colonizing another planet is becoming more realistic. Earth faces challenges such as climate change, resource depletion, and overpopulation, making the search for a second home crucial. Scientists have identified several candidates for human colonization, each with unique advantages and challenges. Mars is considered the most viable option due to its proximity to Earth, manageable distance, similar day length, and the presence of water ice. However, its thin atmosphere, harsh climate, and high radiation levels present significant obstacles. Europa, one of Jupiter's moons, is another contender, offering a vast subsurface ocean that could support life, but extreme cold and radiation exposure make colonization difficult. Titan, Saturn's largest moon, has a thick atmosphere and liquid hydrocarbons, which could serve as energy resources, yet its frigid temperatures and lack of oxygen require advanced life-support systems. While Mars is currently the best candidate, future technological advancements might make other planets and moons viable for human settlement. Continued investment in space exploration and innovation in terraforming, radiation shielding, and energy generation will bring us closer to making interplanetary colonization a reality.

- Exoplanet Kepler-452b is located in the habitable zone of its starlike our earth and its larger than Earth that's why it's also known as super Earth.



Moon



Mars Atmosphere

Waste Disposal in Space: Although controversial, some scientists propose sending hazardous waste into space as an alternative to Earth-based disposal methods. That should minimize.

The Role of Space Exploration in Biodiversity Conservation can also contribute to Earth's preservation. Advanced satellite technology helps monitor deforestation, climate change, and wildlife movements, providing crucial data for conservation efforts. Space research also promotes sustainable resource management and the development of new technologies that reduce environmental damage on Earth. Biodiversity loss is a silent crisis with dire consequences for life on Earth. Protecting our planet must be a priority, and space exploration should not be an excuse to abandon our home but a tool to better understand and safeguard it. The future of humanity depends on both the preservation of Earth and the responsible exploration of new frontiers

Space exploration offers amazing possibilities. But it also has environmental costs. We must balance the good with the bad. It's crucial for our future.

Space exploration leads to new science. It may help us find new resources. Some technologies developed for space help agriculture. Weather forecasting also improves. These advancements benefit us all.

Conclusion:

Earth's environment and space exploration are connected. A balanced approach is essential. Support sustainable practices. Advocate for responsible space travel. We all share the responsibility. Let's protect Earth and shape the future of space together. As we reach for the stars, we must first protect the home that gave us life. Space exploration offers humanity a future beyond Earth, but it should also serve as a reminder of our responsibility to preserve our planet and all its living creatures. Instead of escaping a dying world, let's use our advancements to heal Earth, safeguard its ecosystems, and ensure that no species is lost to neglect. The survival of our planet and the future of space colonization must go hand in hand—because a civilization that cannot protect its own home is not ready to build a new one among the stars. After all one earth one chance.

Author - Simran Khan

T.Y. BSc.

19/03/20025



Make a difference, Start today...

In 2019, anxieties of the COVID-19 pandemic. As everyone is worried about their children's education. By peoples approach I started to spread knowledge in Ramnagar slum. Word spread, and the number of students steadily grew, reaching 80 regular attendees. Overwhelmed by the rising student count, Sonali sparkle by joining this initiative.

With no existing organizations or foundations to support us, we relied on community spirit. Our efforts caught the attention through which needy got ration kits, we got our first whiteboard, every year seva *sahyog* providing study material to all children and We secured a temporary space for children. It felt like every step forward was met with support.

To reach more children, we engage in community programs, celebrating festival, Child Rights Day and participating in competition. Our primary goal is to empower children to speak up, take initiative and build confidence. We've invited police officers for friendly interactions, aiming to shift children's role models away from negative influences they often see in slums. We also visited the child safety unit at the police station. We've attended workshops on child rights, life skills, and more to improve our work. Special thanks to Miracle foundation India.

The Bal panchayat, a children's initiative, and the Child Protection Community, of which we are members, are vital to our work. We address the challenges children face and provide holistic support to them and their families, focusing on family independence. Our ultimate goal is to create a child-friendly community.

I am currently completing my bachelor's degree at Abasaheb Garware College. I need to effectively manage my studies and this initiative. The goal is to foster a culture where all children are encouraged to take initiative. I am grateful for the support of my teachers, who are helping me deepen my understanding of educational principles. I intend to use this knowledge to cultivate a love of learning in children by taking fun learning workshops.

Now Sonali and I am youth ambassador of the Miracle Foundation. received appreciation certificates from UNICEF and numerous recognitions from our community.

We are filled with energy and determination to continue this vital work to reach many more children.

Author - Uday Jadhav

S.Y. BSc.

20/03/2025



India's Fight Against Climate Change: Progress and Challenges

Climate change is no longer a distant threat -it is a crisis unfolding before our eyes. In 2025, Central India experienced its hottest February in 125 years, By the report of IMD. Rising sea levels threaten many districts like Mumbai, while erratic monsoons have led to devastating floods and prolonged droughts. As one of the fastest-growing economies, India faces a dual challenge: driving development while ensuring environmental sustainability. The article explores India's initiatives to combat climate change, recent policy developments, and Pune's role in the green movement.

As a signatory to the Paris Agreement, India has pledged to cut greenhouse gas emissions intensity by 45% by 2030 (compared to 2005 levels), ensure that 50% of its electricity comes from non-fossil fuel sources by 2030, and achieve net-zero emission by 2070. These ambitious goals are necessary to secure a sustainable future, and cities like Pune, a major industrial and educational hub, play a key role in achieving them.

To fulfil these commitments, the Indian government has launched several initiatives. The National Action Plan on Climate Change (NAPCC), introduced in 2008, includes eight missions targeting renewable energy, water conservation, agriculture, and urban sustainability. Among these, the National Electric Mobility Mission aims to deploy 30% electric vehicles (EVs) by 2030, supported by subsidies like the FAME scheme. Additionally, the National Adaptation Fund for Climate Change (NAFCC) funds projects that help vulnerable communities adapt to climate challenges.

As the state and local levels, Maharashtra has launched the Majhi Vasundhara Abhiyan, focusing on grassroots climate action. Pune has seen a 40% increase in solar panel installations since 2020, and the municipal corporation has introduced strict waste segregation policies to improve sustainability. However, despite these efforts, India continues to face major climate challenges. Maharashtra has endured over 15 major heatwaves since 2010, and unpredictable monsoons have significantly impacted agriculture. In 2022, floods in Pune

displaced thousands, highlighting the growing risk of extreme weather event. Scientists warn that such climate disasters will become more frequent unless urgent action is taken.

India is also focusing on renewable energy and green job creation. While the solar and wind energy sectors are expanding rapidly, financial barriers and policy uncertainties pose significant challenges. Many solar projects struggle due to high initial costs, and over 1 million jobs in coal-dependent industries could be affected, necessitating large-scale re-training for green energy employment. Despite these hurdles, India continues to play a crucial role in global climate summits. At COP28, the country led discussions on a just transition away from fossil fuel. Looking ahead to COP29 in Azerbaijan, India will advocate for increased climate finance to ensure developing nations receive the necessary support for sustainability projects.

Pune, as an emerging smart city, has an important role to play in climate action. Citizens can contribute by reducing plastic use, choosing sustainable products, supporting EV adoption, using public transport, and participating in local sustainability projects like tree-planting drives and waste segregation initiatives. Additionally, raising awareness through social media and community programs can amplify climate action efforts.

India has made significant progress in its climate policies, but challenges remain. With increasing environmental risks, cities like Pune must take the lead in sustainable urban planning, clean energy adoption, and community participation. Climate change not just a government issue- it's shared responsibility. The choices we take today will take the future of our planet.

Author – Vaibhavi Vaidya

S.Y. BSc.

23/03/2025



Pollution due to deforestation...

Introduction:

What is deforestation?

Deforestation is the large-scale, permanent removal of forested areas, resulting in the conversion of forest land to non-forest uses. It involves the disruption of ecological processes, leading to a reduction in biodiversity, alterations in biogeochemical cycles, and increased atmospheric carbon dioxide levels, contributing to climate change.

Effect of deforestation on environment:

Deforestation significantly impacts the environment, causing issues like habitat loss, biodiversity decline, climate change, soil erosion, and disruption of water cycles, ultimately affecting ecosystems and human well-being.

1. Loss of Biodiversity:

Destruction of forests leads to habitat loss for countless species, causing a decline in biodiversity.

Many species may face extinction due to the loss of their natural habitats.

2. Climate Change:

Trees act as carbon sinks, absorbing carbon dioxide (CO₂). Their removal increases CO₂ levels, contributing to global warming.

Reduced transpiration from trees affects local and regional climate patterns.

3. Soil Erosion and Degradation:

Tree roots bind soil, preventing erosion. Without vegetation, soil becomes loose and vulnerable to erosion by wind and water.

Loss of topsoil reduces agricultural productivity and depletes soil nutrients.

4. Disruption of the Water Cycle:

Forests regulate the water cycle by absorbing and releasing water through transpiration. Deforestation reduces moisture in the air, leading to decreased rainfall.

It can also lead to more frequent droughts and desertification.

5. Air and Water Pollution:

Burning or logging forests releases particulate matter and greenhouse gases, contributing to air pollution.

Soil erosion can cause sedimentation in rivers and lakes, degrading water quality.

6. Impact on Indigenous Communities:

Indigenous people who rely on forests for their livelihoods, shelter, and cultural practices face displacement and loss of resources.

7. Desertification:

In extreme cases, deforestation can convert fertile lands into deserts, especially in arid and semi-arid regions.

These effects highlight the critical role forests play in maintaining ecological balance and regulating the Earth's climate.

Causes of deforestation:

Play of factors, including agricultural expansion, urbanization, mining, timber logging, and climate change, as well as population growth and unsustainable practices.

Agricultural Expansion:

The growing demand for food and land for livestock grazing and crop cultivation leads to the clearing of forests to create farmland.

Urbanization:

As populations grow, cities expand, requiring land for housing, infrastructure, and other urban developments, leading to deforestation.

Timber Logging:

The demand for wood and timber for construction, furniture, and other products drives illegal and unsustainable logging practices, resulting in widespread deforestation.

Mining:

Mining activities, particularly for minerals and fossil fuels, often involve large-scale deforestation to access resources and establish infrastructure.

Climate Change:

Climate change, including rising temperatures and altered precipitation patterns, can increase the risk of wildfires and make forests more vulnerable to pests and diseases, leading to deforestation.

Population Growth:

A growing global population increases the demand for resources, including land and food, which can lead to deforestation as land is converted for agriculture and other uses.

Soil Degradation:

Deforestation can lead to soil degradation, as tree roots help bind soil particles, and when trees are cut down, the soil particles tend to disperse, negatively impacting the quality of the soil.

Fires:

Forest fires, often exacerbated by climate change and human activities, can destroy vast areas of forest, contributing to deforestation.

Animal Agriculture:

The expansion of animal agriculture, including the clearing of land for grazing and the production of feed crops, is a significant driver of deforestation, particularly in regions with large livestock populations.

Conversion of Forested Land to Farmland:

As the demand for food and land for agriculture increases, forests are often cleared to make way for farmland, leading to deforestation.

Conclusion:

Deforestation poses a severe threat to the environment and human well-being, leading to biodiversity loss, climate change, and habitat destruction, necessitating urgent action for sustainable forest management and conservation.

AUTHOR –

Prof. Dr. Nirbhay Sudhir Pimple
Head, Department of Zoology,
MES Abasaheb Garware College,
(Autonomous).

Environmental issues concerning India and The World

The environment is a complex system that includes everything around us. It includes the air we breathe, the water we drink, and even our homes. Environmental changes are those that affect any part of this ecosystem in a way that may cause harm or damage to living things. Environmental problems occur when there is an imbalance between human activities and natural processes.

There is no doubt that the environment is in trouble. Climate change, deforestation, and pollution are just a few of the pressing environmental issues that we are facing today. And it's not just a problem for countries in the developing world – every country on Earth is affected by environmental degradation.

The environment is constantly changing and evolving. The population is growing and with it, the demand for resources. This can often hurt the environment. It is important to be aware of the environmental issues facing India and the world so that we can take steps to mitigate their effects.

- In India, air pollution has become a huge problem. The United States' coal-fired power plants produce more than 50 per cent of the world's sulphur dioxide. This gas is a major contributor to acid rain and other forms of environmental damage. India is also home to some of the most polluted cities in the world. This includes New Delhi, which was ranked first for air pollution by WHO Global Ambient Air Quality Database (GAAQD) in 2024
- India has had one of the highest rates of deforestation in recent years with about 11 million hectares lost since 1951. Deforestation causes climate change by making emissions from burning forests and releasing carbon dioxide into the atmosphere from decomposed trees
- Forest fires are another source of greenhouse gas emissions that contribute to global warming as well as cause localised pollution. The number of forest fires in India has been increasing steadily over the years

- In addition to air pollution, water pollution is also a major concern in India. Every day, a lot of untreated sewage is discharged into rivers and other water bodies. This makes the water unfit for human consumption or irrigation
- The Ganges River, considered sacred by Hindus, is one of the most polluted rivers in the world. The city receives about 400 million litres of wastewater every day that is not treated. This wastewater comes from many different sources, including homes, religious places, businesses, and hospitals.
- The Yamuna River, which flows through Delhi, is even more polluted with about 620 million litres of raw sewage being dumped into it daily
- Maintaining biodiversity is necessary for a healthy ecosystem. Nature provides us with clean air and water, fertile soil for growing food, and medicines that can treat diseases such as cancer or HIV/AIDS. Biodiversity helps protect us from natural disasters like floods and droughts. During rainstorms, biodiversity absorbs excess stormwater. And during dry periods, it retains moisture
- The loss of biodiversity has been a pressing environmental issue in India for many years. This is because humans have destroyed habitats through activities like logging, mining and urbanisation. In addition to the high rates of deforestation in this country (about 11 million hectares have been lost since 1951), it also causes an imbalance in ecosystems where animals cannot survive and find food. Many species in India are also threatened by poaching and the illegal wildlife trade
- The Bengal tiger is one of the animals that faces a high risk of extinction due to poaching and habitat destruction. There were estimated to be only about 2000 tigers left in the wild in India as of 2024. The Indian rhinoceros is another critically endangered animal, with only about 2700 remaining in the wild. Habitat loss has been a major threat to their survival, but they're also poached for their horns which are used in traditional Chinese medicine
- It's not just animals that are at risk from environmental issues in India – humans too are being affected. Over half of India's population – 620 million people – lives below the poverty line. These people often do not have access to clean water or electricity because they cannot afford it
- The Indian government has set up national parks to protect the country's biodiversity. These parks allow animals to roam freely without being disturbed by humans. For example, people can drive through the parks on roads near the areas.
- In addition, there are strict laws against poaching animals like tigers which carry heavy penalties if found guilty. However, more needs to be done because many species have been saved so far. Governments around the world have limited resources, so they need to spend wisely while also prioritising other issues such as famine relief programmes

Conclusion:

To provide a better understanding of the environmental crisis, we looked at India and how it is uniquely impacted by climate change. The country faces challenges such as rising temperatures, pollution, and deforestation. We also talked about what can be done to address these issues on an individual level so that the world has a chance for survival. It is already time that we take action on these issues to ensure a safe and sustainable future.

Author – Amita Naik
Prof, Department of Zoology
MES Garware College, Pune (Autonomous)

Co-Author - Aryan Apte
T.Y. BSc.
22/03/2025



Masters Of the Grasslands –

PREDATORS THAT RULE THE OPEN PLAINS...

The wild is a realm of mystery and survival, where each creature plays a vital role in maintaining nature's delicate balance. From dense rainforests to vast open plains, wildlife thrives in diverse habitats, adapting to the challenges of an ever-changing environment. Whether it's the silent prowl of a predator, the intricate camouflage of an insect, or the migratory journey of a bird, every species has a story to tell.

Driven by the love for wildlife and photography, I have used macro lenses, underwater gear, nocturnal lighting and many other techniques to get shots of a diverse mix of subjects and managed to capture some of the grassland brutes around the Indian realm.

To me, it feels like the photographs don't do justice to the amazement and glory that I felt during these expeditions and I live these memories to this date.

Talking about glory,



- ***The Crested Serpent Eagle:*** A Master of the Skies -

With its piercing yellow eyes, bold crest, and powerful stance, this raptor is a dream to all wildlife photographers. Found across South and Southeast Asia, this eagle thrives in forests and open woodlands, offering diverse opportunities for stunning captures. Crested Serpent Eagles are often perched high in dense foliage or gliding through the canopy. Early morning and late afternoon are ideal for photography, as the golden light accentuates their deep brown plumage and intense gaze. Listen for their signature high-pitched calls, which often reveal their presence before they come into view. Whether perched regally on a high

branch or soaring through the canopy, every moment with this bird offers a chance to capture nature's raw elegance.

- ***The Indian Eagle Owl:*** A Majestic Nocturnal Predator

The Indian Eagle Owl, is a large and powerful raptor native to the Indian subcontinent. This species is a nightmare for rodents and serves as an essential part of the ecosystem, playing a vital role in controlling rodent populations and maintaining ecological balance. The Indian Eagle Owl is a robust bird, measuring between 50 to 65 cm in length with a wingspan of approximately 125 to 150 cm. Its striking orange eyes, prominent ear tufts, and mottled brown plumage help it blend seamlessly with its rocky and forested habitats.



The underparts are pale with dark streaks, aiding in camouflage. Being a nocturnal predator, the Indian Eagle Owl is a skilled hunter. Its deep, resonating hoots serve as territorial calls and mating signals. Its deep, resonating hoots serve as territorial calls and mating signals.

- ***Montagu's Harrier:*** A Graceful Migratory Raptor -



The **Montagu's Harrier** is a slender and elegant bird of prey belonging to the harrier family known for its striking appearance, agile flight, and long-distance migrations. Named after the British naturalist *George Montagu*, this species is widely distributed across Europe, Asia, and parts of Africa. Males are strikingly pale grey with black wingtips and a distinct white rump, whereas females and juveniles exhibit brown plumage with streaked underparts for effective camouflage in their grassland habitats. This species breeds across Europe and parts of temperate Asia, favoring open landscapes such as grasslands, wetlands, and agricultural fields. In winter, Montagu's Harrier undertakes a long migration to sub-Saharan Africa and the Indian subcontinent, where it roosts in communal groups, often alongside other harrier

species. Unlike other raptors, this bird of prey nests on the ground typically in dense vegetation or within cereal crops.

- ***Short Eared owl:*** A Widespread and Elusive Hunter -

A medium-sized owl known for its distinctive hunting style, diurnal habits, and widespread distribution across the globe. Unlike many owl species, it is often active during the day, making it one of the more commonly observed owls in open habitats. Despite its name, its ears or feather tufts are often barely visible. Its round, pale face and striking yellow eyes enhance its nocturnal and crepuscular vision. It holds the title of being the most widely distributed owls in the world. The Short-eared Owl is classified as least concern by the IUCN, but its populations fluctuate due to habitat loss, agricultural development, and changes in prey availability. Being a ground-nesting species, it is particularly vulnerable to habitat destruction from farming, urbanization, and climate change. Conservation efforts focus on protecting grasslands and wetlands to ensure stable populations. Monitoring population trends is essential to understanding long-term ecological impacts on this species.



- ***Jungle Cat:*** A Stealthy and Adaptable Wild Feline

Jungle cats are robust and agile with long legs, a relatively short tail, and a distinctive appearance marked by a reddish-brown, sandy, or greyish coat. The ears are pointed with short black tufts, similar to lynxes, and their eyes are adapted for sharp nocturnal vision.



Jungle cats are primarily crepuscular and solitary hunters, relying on stealth and speed to catch their prey. They feed on small mammals, birds, reptiles, amphibians, and insects. They are excellent swimmers and may even hunt fish. Unlike larger wild cats, Jungle Cats do not rely on ambush tactics but rather chase down their prey in open terrain.

Despite its name, it is not restricted to dense jungles and is commonly found in wetlands, grasslands, and scrub forests and also known as swamp cat. The Jungle Cat is a fascinating and adaptable species, thriving in diverse environments. Its role in controlling rodent populations makes it ecologically significant, but conservation efforts are necessary to mitigate threats and ensure its long-term survival.

- ***Bengal Fox:*** The Elusive Fox of the Indian Subcontinent

The Bengal Fox is an integral part of the Indian subcontinent's ecosystem, playing a vital role in controlling prey populations and maintaining ecological balance. Despite its adaptability, conservation efforts are necessary to protect its habitat and ensure its long-term survival. Raising awareness about the importance of this species is crucial to reducing human-induced threats.

The Bengal Fox is primarily nocturnal or crepuscular, becoming more active during dawn and dusk to avoid extreme daytime temperatures. It is an omnivore, feeding on small mammals, birds, reptiles, insects, and fruits. The fox is known for its exceptional speed and agility, which helps it evade predators like leopards, wolves, and large birds of prey. Despite its exceptional speed and extreme agility, it can't outrun increasing threats from habitat destruction, poaching, roadkill, and human-wildlife conflict. Bengal Foxes are found across India, primarily in grasslands, scrublands, dry deciduous forests, and semi-arid regions. They avoid dense forests and extreme desert conditions but are adaptable to agricultural landscapes as well.



Author — Sneha Shirse

Prof, Department of Zoology

MES Garware College, Pune (Autonomous)



WASTE MANAGEMENT: A MAJOR ISSUE IN CITIES

Cities across globe have seen a rising population over last few decades. This brings its own benefits and drawbacks.

A major drawback is the question of managing a large amount of waste that is being generated. This can be attributed to an increasing trend of capitalist economy. People also migrate to cities in search of better living standards and a livelihood. Whatever might be the reason, waste management in cities is becoming challenging day by day.

Government has framed waste management rules. Their effective implementation is the key for solving waste management issue. Waste segregation into dry and wet or degradable and non-degradable waste at the source reduces the downstream efforts of sanitation workers. This is responsibility of every citizen. Many gated communities segregate, collect and treat their own waste. Their technology and efforts have to be popularized via newspapers or digital media. This would impart knowledge and encourage other citizens in the process.

In nature, various microorganisms and macro-organisms take part in breakdown of biodegradable waste. For e.g earthworm, bacteria, fungi, etc. These are known as decomposers. Also, birds like eagle, crow, vultures, etc are scavengers. They feed on carcasses of dead animals and help to clean the environment. Dead plant material is acted upon by bacteria and fungi. Potential of these animals have to be recognized. Appropriate technology for the same has to be developed so they can be utilized in waste management process. Also, stems of leafy vegetables can be fed to domestic animals like cow, sheep, pigs, etc. Fruit peels can be used to make bio enzyme. Flowers from used flower garland can be used to make compost. Thus, managing waste can also create new job opportunities for the stakeholders.

It is a matter of citizen responsibility towards environment. Humans and their environment are inseparable. It is time to search sustainable solutions for maintaining a sustainable environment. Nature, itself offers such solutions through natural processes. There is a need to closely monitor and utilize them in the waste management process.

Author – Shruti Paripatyadar

Prof, Department of Zoology

MES Garware College, Pune (Autonomous)



Climate change and the possibility of future pandemics

Just a few years ago, all the epidemiologists, scientists and doctors in the world were trying their best to understand the symptoms brought on by the COVID 19 virus and trying to find out more about the origin of the virus and how it had jumped from host to host in a case of spillover, the phenomenon where a virus overcomes the species barrier to infect susceptible species other than its host. But few people had time to consider the fact that such a pandemic was a symptom of a sick planet in the first place. Scientists now think that the most plausible explanation of how SARS-CoV2 breached host species barriers to ultimately infect humans is as follows: Coronaviruses commonly infect bats. The bat hosts of the ancestor of SARS-CoV2 virus are naturally distributed in the caves of south-western China. Their geographic distribution and the distribution range of the suspected intermediate host species showed no overlap. But the warming climate had led to the bats gradually expanding their geographic range to cover most parts of south and central China. This dispersal of the coronavirus-laden bat species eventually resulted in overlapping ranges with many of the suspected intermediate host species that were sold at the Wuhan wet market and probably gave the virus a chance to jump from bats to other species, ultimately being able to infect humans.

This accidental effect of the changing climate led to a global catastrophe and gave us our first taste of what is yet to come. Our planet and the life that originated on it have spent the last four billion years co-evolving and shaping each other's fundamental properties. This has created a finely balanced natural world of diverse ecosystems that are inextricably linked to the well-being of our planet and every species that lives on it. Environmental factors like climate and rainfall not only have an enormous effect on the kind of ecosystem that forms somewhere, but also restrict most species from dispersing globally, creating characteristic biomes all over the world. Healthy ecosystems are also resilient to disturbance and contribute significantly to maintain the planetary conditions that help life thrive.

When the capacity of these ecosystems to resist the effects of man-made pressures is exceeded, they start deteriorating to the point of collapse. Our activities over the last two centuries have been taking a steady toll on the ecosystems on Earth and they have gradually lost the power to cope with this stress. It is in such weakened and susceptible natural world

are created frequent opportunities for new pathogens to arise and spread, leading to pandemics on never-before-seen scales. Climate change is one of the most significant consequences of unrestricted use of greenhouse gas emitting technologies and has led to a general warming of our planet, blurring the climatic boundaries between distinct biomes.

The contribution of climate change in bringing on a pandemic is multi-fold. As illustrated by the example of COVID-19 causing coronavirus, a novel or already existing pathogen can rapidly spread from species to species because of expanding and overlapping ranges of its potential hosts. A warming world provides opportunities for warmth-loving species to invade new habitats in the traditionally colder parts of the world, while cold-loving species become adapted to the new, warmer conditions. The latter possibility is the premise of a widely popular video game and a television series, where a fungal parasite that usually infects cold-blooded invertebrates, adapts to warm temperatures and starts infecting humans, creating a deadly pandemic. The evidence of climate change that we have makes such scenarios seem less unlikely and fictitious day by day. How can we be sure that a tropical disease will not spread throughout the world because it has become uniformly warm or that a pathogen that has lain dormant in the polar ice caps will not be released once the ice melts irreversibly?

Year by year, the changing climate is helping some species overcome the natural barriers to dispersal and such species are slowly becoming global in distribution. These invading species wreak havoc in the new ecosystems that they invade and create imbalance. What if the next species to spread invasively also carries a pathogen with it to newer regions, which becomes the cause of the next pandemic? Apart from these indirect effects, climate change is also leading to direct conflict between wildlife and humans and these frequent negative encounters between humans and wild species only increases the chances of spillover.

So, does that mean that there is no hope for a better future, and we must brace ourselves for the onslaught of the next pandemic? Definitely not! Our planet has exhibited an extraordinary ability to recover from very dire situations in the past. Life on this planet has survived five mass extinctions after all! We just have to give our ecosystems a fighting chance by doing our duty and drastically decreasing our carbon emissions as well as curbing the excessive carbon that we have already released in the atmosphere. Our ecosystems will do the rest. Healthy ecosystems mean a healthy planet and just as a healthy individual is immune to an infection, a healthy planet is immune to the ravages of a pandemic.

Author – Dr. Parna Bhadra

Prof, Department of Zoology

MES Garware College, Pune (Autonomous)

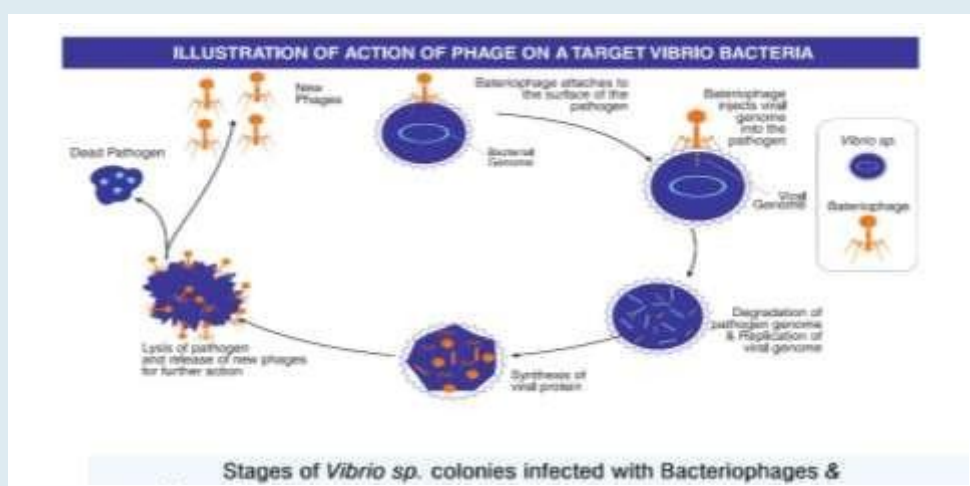


SELF-PURITY

Megasthenes (ca. 350-290 BCE) mentioned (*Indica*) of a river that sources from the mountains stretching along northern plains, flowing from North to South and merging into the ocean along the Gangaridai (geographical region of the Indian subcontinent) is "The Ganges" that holds the life of the people living there. It begins from Devprayag where its head streams the Alaknanda and the Bhagirathi join together to be called as The Ganges. The holy Ganges (Ganga) known for its purity from the time immemorial is the site of holy dips and many religious practices (sacred performance in one's whole life). They say that it's the purest of all waters and it can purify one's 'self and soul' by removing the internal negativity. A dip and the following the religious activities in the Ganges during Somvati Amavasya, Makar Sankranti, Kartik Poornima, Ganga Dashahara and the Kumbh Mela is considered to be pious. A huge congregation of pilgrims is seen during these occasions along the banks (*ghats*) to take holy dip and perform religious activities.

Here lies our introspective site of how these *ghats* are so sacred and what's there in the water that causes it to remain pure against all odds? Is there any basis for this purity in the eyes of science? Century long series of studies in the pursuit of these questions speak of the self-cleansing and disease healing properties of the Ganga water because of the presence of at least 1000 types of Bacteriophages (viruses that kill bacteria or bacteria eating viruses, image) in it. *Charak Samhita* (1st Century CE) considers that it is pure, sacred and is the major source of drinking water as no germs can survive in it. Ernest Hankin (1896), a british bacteriologist, documented the presence of antibacterial substances in the Ganga water against bacteria causing Cholera and it can also reduce the outbreaks of the disease. Studies also show that it is capable of reducing its BOD (Biological Oxygen Demand) levels quicker as compared to other rivers. As the presence of organic matter depletes the Dissolved Oxygen (DO) level of water, the process of decaying slows down drastically. It is already studied that the Ganga water, by virtue of some unknown component(s) maintains the DO level at 25 times higher than rest of the major rivers in India and does not get contaminated when kept in storage for years. Mosquitoes do not breed in the upstream water and even after mixing with other river waters downstream, it prevents mosquito breeding (MRC, New Delhi). *Escherichia coli* bacteria cannot grow well in its water and even adding five times more *E. coli*, it does not change the properties as it remains equally active in eliminating the

bacteria even after 16 years in storage (NBRI, Lucknow and National Ganga Tribunal). Scientists from NEERI, Nagpur, suggested that it is the sediments of this river that has something in common from Uttarkashi to Varanasi to Patna in its flow through different geographical localities. Water samples collected from 38 bathing *ghats* or locations in the whole course of the Ganga were analysed and compared with that of Yamuna and Narmada showing the presence of 143 types of bactericidal phages against many pathogens (National Mission for Clean Ganga- NEERI, 2014, 2019). These pathogens include *Mycobacterium*, *Streptococcus*, *Pseudomonas*, *Yersinia*, *Salmonella*, *Staphylococcus*, *Klebsiella*, *Vibrio*, *Shigella*, *Clostridium*, *Acinetobacter*, *Erwinia*, *Aeromonas*, *Escherichia*, *Cronobacter*, *Enterobacteria* and *Campylobacter*.



There are already set guidelines by the central government to be followed while visiting the major river banks in our country. According to the Bramhananda Purana, there are thirteen types of activities like water dumping, bathing, defecation and throwing discarded flowers that should not be done on the sacred river banks and it also mentions guidelines as to how do we behave on these banks. Such prohibitions extremely contradict the contemporary practices. About 100-200 km upstream of Haridwar, the water is highly pristine and has the true self cleansing properties and it decreases moving further down. It is during its last stretch of the course where the cleansing properties worsen. Reasonably enough, increased human activities leading to pollution and presence of huge amounts of bacteria has often overpowered the cleansing virus population. The Central Pollution Control Board (CPCB) in the National Green Tribunal (NGT), 2025, revealed that Sangam and six other locations had high concentration of BOD pointing to the decaying organic matter in it. Faecal coliform bacteria, several times higher than normal standards was found there.

A press release by the state government in the context of the Mahakumbh Mela recently states that "Due to this self-purification mechanism of the Ganga, the water remained unpolluted even after 57 crore devotees bathed in it." Without going into a 'fact check', we can conclude that, it is the in-built nature of a river to purify itself and maintain its water quality. In course of this process, they break down, treat and absorb the organic

waste if not the chemical industrial waste is poured into it or if not the water is used for hydel power generation. A river with a free flow can definitely purify itself and maintain the DO level. A report submitted by the Ganga Rejuvenation Action Plan, 2014 says, the flow of water is extremely reducing every time in the dry season, upper reaches are also showing signals of pollution and untreated sewage in addition to solid waste contributes to the pollution of the river. It is extremely required to raise the DO level of the river. To retain the clean water and the uninterrupted flow, combined and comprehensive efforts are required. As the river continues to flow and the dependent ecosystem is restored with proper efforts, it will regain its unique characteristics and purity for which it is worshipped with time.

□□□□□ च □□□□□ □□□
□□□□□□□ □□□□□□□ | □□□□□
□□□□□□ □□□□□□ □□□□□□□□□□
□□□□□ □□□□□ ||

Author – Himanshu Thorat

T.Y. BSc. zoology

15/03/2025



Into The Wild: A Zoological Expedition



1. More Than Just a Field Trip

There's something extraordinary about stepping out of the classroom and into the field where textbooks come to life, and every rustling leaf or distant call hints at a new discovery. Our T.Y. BSc. zoology excursion to Dandeli, Ganeshgudi, Anshi, and Karwar from February 4th to 9th, 2025, was more than just a study tour; it was an immersive dive into India's Western Ghats and coastal ecosystems.

The primary objectives of this trip were to:

- Observe and document biodiversity across terrestrial, freshwater, and marine ecosystems.
- Understand animal behaviour, ecological roles, and species interactions.
- Practice field techniques such as birdwatching, night trails, and species identification.
- Experience the thrill of hands-on learning while also forging friendships, teamwork, and shared adventures.

Over the course of six days, we explored dense forests, trekked through the Dandeli Wildlife Sanctuary, embarked on marine biodiversity surveys at Karwar, and engaged in various activities like photography, night trails, and species identification workshops. But beyond the research, we also found moments of fun—playing volleyball, archery, late-night campfire games, and even celebrating birthdays in the wild.



2. From Rail Tracks to Rainforests

The night of February 3rd, 2025, was filled with restless excitement as we gathered at Pune Railway Station at 10 PM. Our backpacks were stuffed with binoculars, field guides, and enough dry snacks to last the trip. As the train pulled out of the station, the reality of our six-day adventure into the wilderness set in. Conversations drifted between expectations for the trip, last-minute revisions of bird names, and—inevitably—food. After an overnight journey, we arrived at Londa, Karnataka, at 9:30 AM, bleary-eyed

but eager. From there, we set off towards Dandeli, driving 50 km through dense forests. Even before reaching our stay at Prakriti Cottages, we caught our first glimpses of the region's biodiversity—flashes of bright plumage from passing birds, a troop of langurs watching us from the trees, and the distant call of a Malabar whistling thrush. By the time we arrived at our accommodation, exhaustion had set in, but the anticipation of our first field outing kept us moving. After lunch and a short rest, our adventure into the wild truly began.



3. First Encounters with the Wild

Our first destination was a small water body frequented by many birds, which was followed by a visit to Syntheri Rocks, an imposing limestone formation carved by the Kali River over thousands of years. While the geology was fascinating, we were more focused on the biodiversity around us. Crocodiles basked on the riverbanks, completely still except for the occasional flick of a tail, and egrets stood like statues in the shallows.

From there, we continued to Supa Dam, where we saw a mix of waterfowl, raptors, and smaller forest birds. With our binoculars pressed to our eyes, we spotted Indian cormorants diving for fish, a Brahminy kite soaring above, and a vibrant green bee-eater perched on a branch, waiting for its next catch.

That evening, we gathered around the campfire for our first night trail, where we set off into the darkness with only torches and a sense of adventure. Spiders, frogs, and a civet's glowing eyes in the undergrowth greeted us, but the most thrilling part was simply the experience of walking through the forest at night, relying on our senses to detect movement and sounds in the eerie silence.



The King and The Hidden River

The morning air was crisp as we set out for Kali Tiger Reserve, our safari vehicle rumbling along the narrow dirt track. The forest stretched endlessly around us, its dense canopy filtering golden rays of sunlight. We had all imagined spotting a big cat silently stalking through the undergrowth or a herd of gaurs grazing in a clearing, but the jungle had its own way of surprising us.

Instead of large mammals, the reserve greeted us with an orchestra of birds, each species adding its own notes to the morning chorus. The unmistakable call of a pied hornbill rang through the trees before we spotted it—a massive figure perched high above, its curved bill and casque giving it a prehistoric appearance. Below, a pair of flameback woodpeckers hammered against the bark of a tree, their brilliant red crests flashing with each movement. As we drove deeper, we came across a dry, fire-scorched riverbed where a group of emerald doves was pecking at the ground, foraging for fallen seeds and insects. Their iridescent green feathers shimmered under the soft light, contrasting starkly against the dark, cracked earth. It was a striking sight—nature reclaiming what had been lost, adapting and persisting despite past disturbances. Then, just as we thought the forest had given us all it had to offer, someone pointed upward. There, nestled in the crook of a high tree branch, was an Indian giant squirrel curled up in peaceful slumber. Its enormous, bushy tail draped over the branch like a blanket, and for a moment, it was completely still—just a patch of russet and black blending into the foliage. Then, with a lazy stretch, it flicked its tail, adjusted its position, and continued sleeping, completely undisturbed by our presence below.

Though we didn't see any of the large predators we had hoped for, this experience reinforced a valuable lesson—the jungle is always alive, always moving, even in its quietest moments. From the smallest insects to the largest birds, every creature played a role in the intricate, ever-changing web of the forest.



The Ancient Reptiles and Paradise for Birds

Day two began with a visit to Crocodile Park, where we observed these prehistoric predators up close. The marsh crocodiles lounged lazily in the sun, eyes barely open, conserving energy for their next hunt. Some of them looked almost fake—completely still, as if carved from stone—until one suddenly flicked its tail into the water, sending ripples across the surface.

From there, we travelled to Old Magazine House, a birdwatcher's paradise. Unlike the dense forests of Dandeli, this site was designed for close encounters with rare birds. The air was filled with movement and song as we spotted the Flame-throated bulbuls, the state bird of Goa, flashing bright orange against the green. Malabar pied hornbills, their enormous beaks making them impossible to miss, emerald doves with their jewel-green lustrous coat, Indian white eye, red spur fowl, oriental magpie-robin and many more. The hours spent here felt like minutes, and by the time we left, we had added more birds to our checklist than we could count.



The Road Less Travelled

Our third morning took us to Timber Yard, a familiar birdwatching site known for its spotted deer, hornbills, and Malabar barbets. But the real adventure began in the afternoon when we decided to take an unmarked path, one rarely visited by vehicles. It was there, in that quiet stretch of forest, that we got our first sighting of an Indian jackal. It stood in the distance, watching us curiously before slipping away into the trees. Moments later, a flash of color caught our eyes—a Malabar trogon, its brilliant red and black plumage standing out against the dense green soon becoming the highlight of our entire expedition.

And then, as if the forest was rewarding us for venturing off course, we spotted a Malabar flying lizard. It clung to the bark of a tree, blending in almost perfectly—until, suddenly, it extended its wing-like flaps and glided effortlessly to another trunk. It was a rare and spectacular sight.

Throughout the trip, we also regularly saw Malabar giant squirrels, their large bushy tails swaying as they leapt from branch to branch. Near our resort, an owl had become a familiar presence, always perched on the same tree, watching silently as we passed by.



The Call of the Ocean

On our final morning in the forests, we made an impromptu stop at a freshwater stream. Kneeling by the clear, cool water, we spotted various freshwater fish—Rasbora daniconius, Malabar danios, and a few species of killifish. Insects skimmed the surface, and tiny tadpoles wriggled in the shallows, hinting at the amphibian life thriving here. With one last deep breath of the forest air, we packed up and continued our journey toward the coast.



The Ocean's Secrets

The salty breeze hit us before we even saw the water. After days spent in the thick forests of Dandeli, the transition to the vast openness of the Arabian Sea was almost overwhelming. The waves crashed onto the golden sands of Teelmati Beach, a rhythmic, endless motion that had continued for millions of years, long before humans had arrived to marvel at it.

Unlike the dense jungles we had explored, where life often remained hidden in the shadows, the shoreline revealed its biodiversity in plain sight. With every step we took, we uncovered a new piece of this ecosystem's puzzle. The sand was scattered with mollusc shells, remnants of tiny creatures that had once lived beneath the waves. Hermit crabs scuttled across the beach, each carrying a home that once belonged to something else, a perfect example of nature's ability to reuse and repurpose.

The lagoon pools held even more surprises. Damsel fish darted between coral fragments, their yellow bodies flashing beneath the clear water. Other small lagoon fish swam lazily among the rocks, blending effortlessly with the shifting sands. Here, the water was calm, a stark contrast to the roaring ocean just beyond. It was a sanctuary, a place where smaller creatures could hide from predators and the force of the waves.

One of the most mesmerising sights of the day was a jellyfish drifting aimlessly in the shallow water. Its translucent body pulsed as it moved, delicate yet strangely alien, a reminder of how much of the ocean remains a mystery to us. Nearby, we spotted *squilla* shrimp—also known as mantis shrimp—nestled among the rocks. Despite their small size, they are among the most powerful hunters of the sea, delivering strikes with their club-like appendages.

Then there were the crabs. Everywhere. Rock crabs clung to boulders, sand crabs burrowed into the shore, and ghost crabs moved so quickly that they seemed like illusions. Each species played a role, scavenging and aerating the sand, contributing to the delicate balance of this coastal ecosystem.

But as breathtaking as these discoveries were, they came with a stark realization—the ocean, for all its vastness and beauty, is in danger.

The Silent Crisis

Standing on the shore, it was impossible to ignore the human impact on this fragile ecosystem. Among the natural debris of shells and driftwood, there were also plastic bottles, fishing nets, and other traces of pollution that didn't belong there. Even on a relatively untouched stretch of coastline, the marks of human activity were evident. Plastic pollution is one of the biggest threats to marine life. Sea turtles mistake plastic bags for jellyfish, leading to fatal blockages in their digestive systems. Fish unknowingly ingest microplastics, which then travel up the food chain—eventually reaching us. Coral reefs, which support nearly 25% of all marine life, are dying due to rising ocean temperatures and pollution.

Another silent crisis is habitat destruction. Coastal developments, unregulated fishing, and tourism have caused massive damage to marine biodiversity. Mangroves—natural barriers that protect coastlines from erosion and storms—are being cleared at

alarming rates, despite the fact that they serve as nurseries for many marine species. Coral reefs, once teeming with life, are experiencing mass bleaching events, leaving behind the skeletal remains of once-thriving ecosystems. Perhaps the most unsettling realisation was that most people don't see these changes happening. The ocean hides its suffering beneath the waves, making it easy to ignore. But after witnessing its beauty firsthand watching the hermit crabs searching for new shells, seeing the jellyfish pulsing gently in the water, observing the damsel fish defending their tiny territories—we knew that protecting this world was not optional; it was a responsibility.



What Can Be Done?

Education and awareness are the first steps toward conservation. Understanding marine ecosystems, their delicate balance, and the threats they face is crucial. Field experiences like this one make it personal—we weren't just reading about pollution and habitat destruction in a textbook; we were standing in it, witnessing the effects firsthand. Marine protected areas (MPAs) and sustainable fishing practices are key to preserving biodiversity. Many countries have established no-fishing zones, allowing marine populations to recover.



Responsible tourism, where visitors respect ecosystems rather than exploit them, can also make a difference. On an individual level, small actions can have a big impact. Reducing plastic use, supporting ethical seafood choices, and spreading awareness are all steps in the right direction. The ocean doesn't need grand gestures—it needs consistent, mindful changes in human behaviour.

As we stood on the shore, watching the sun dip below the horizon, the weight of these realisations settled in. The ocean is vast, yes, but it is not invincible. It is alive, interconnected, and vulnerable. And it is up to us—scientists, conservationists, travellers, and everyday people—to ensure that it continues to thrive. We left the beach that evening with more than just photographs and

field notes. We left with a sense of purpose.

Epilogue

The Wilds, The Waves and Everything in Between

As the train rumbled back toward Pune, exhaustion and quiet reflection settled over us. For six days, we had been part of something bigger than just a study tour—we had walked the ancient forests of Dandeli, traced the winding rivers of the Western Ghats, and stood at the edge of the endless ocean, watching the waves carry stories older than time itself. What had started as an academic excursion had transformed into something deeply

personal, something that felt like a scene from an adventure film—equal parts discovery, friendship, and the realization that the world was far more intricate and alive than we had ever imagined. We had set out on this journey with the excitement of explorers, eager to check species off our lists and collect data, but what we took back was far greater. We learned that nature doesn't just exist in textbooks—it breathes, it moves, and it reacts to our presence. We saw it in the cautious, piercing gaze of a Malabar trogon perched silently in the forest, in the gentle sway of an emerald dove nibbling at the remains of a scorched riverbed, and in the playful darting of damsel fish fiercely guarding their tiny underwater kingdoms.



We had felt the thrill of adventure—the rush of spotting a rare flying lizard in the wild, walking through a jungle at night with only torches and trust, standing knee-deep in tide pools watching crabs scuttle past our feet. But we had also felt something deeper—an understanding of how fragile this beauty was, how it was constantly under threat, and how, as zoologists, travellers, and simply as people who cared, we had a duty to protect it. But beyond the science, beyond the conservation efforts and species checklists, this trip gave us something even rarer—each other.



The laughter shared around a midnight campfire, the spontaneous volleyball matches during breaks, the jokes exchanged over binoculars while waiting for a hornbill to move, the birthday celebrations under the stars—these moments together created a beautiful pageant of friendships that felt as natural as the ecosystems we had explored. We weren't just

a group of students on a field trip. We were a team, a family, bound together by a shared love for nature, a shared curiosity, and a shared belief that what we were experiencing was something truly special.

As the first signs of Pune approached the horizon, reality crept back in. Soon, we would step off this train, return to our routines, and swap out field boots for lecture halls. But something had changed in all of us. We weren't coming back as the same people who had left a week ago. We carried with us the forests, the rivers, the ocean, and the unshakable feeling that we had been part of something unforgettable.

As the train slowed, we exchanged tired smiles, knowing that this wasn't just the end of a journey. It was the beginning of a hundred new ones.



DEPARTMENTAL ACTIVITIES!



...



CULTURAL DAY 2024 – ZOOTOPIA



Science exhibition And Happy Faces





*Our Evergreen,
Faculty Members*





Tour Visits and What Not!!



BAIF- DEVELOPMENT AND RESEARCH FOUNDATION



CBRTI – Central bee research and teaching institute



The Government fish seed production unit, Hadapsar



Thank You,

For Reading...