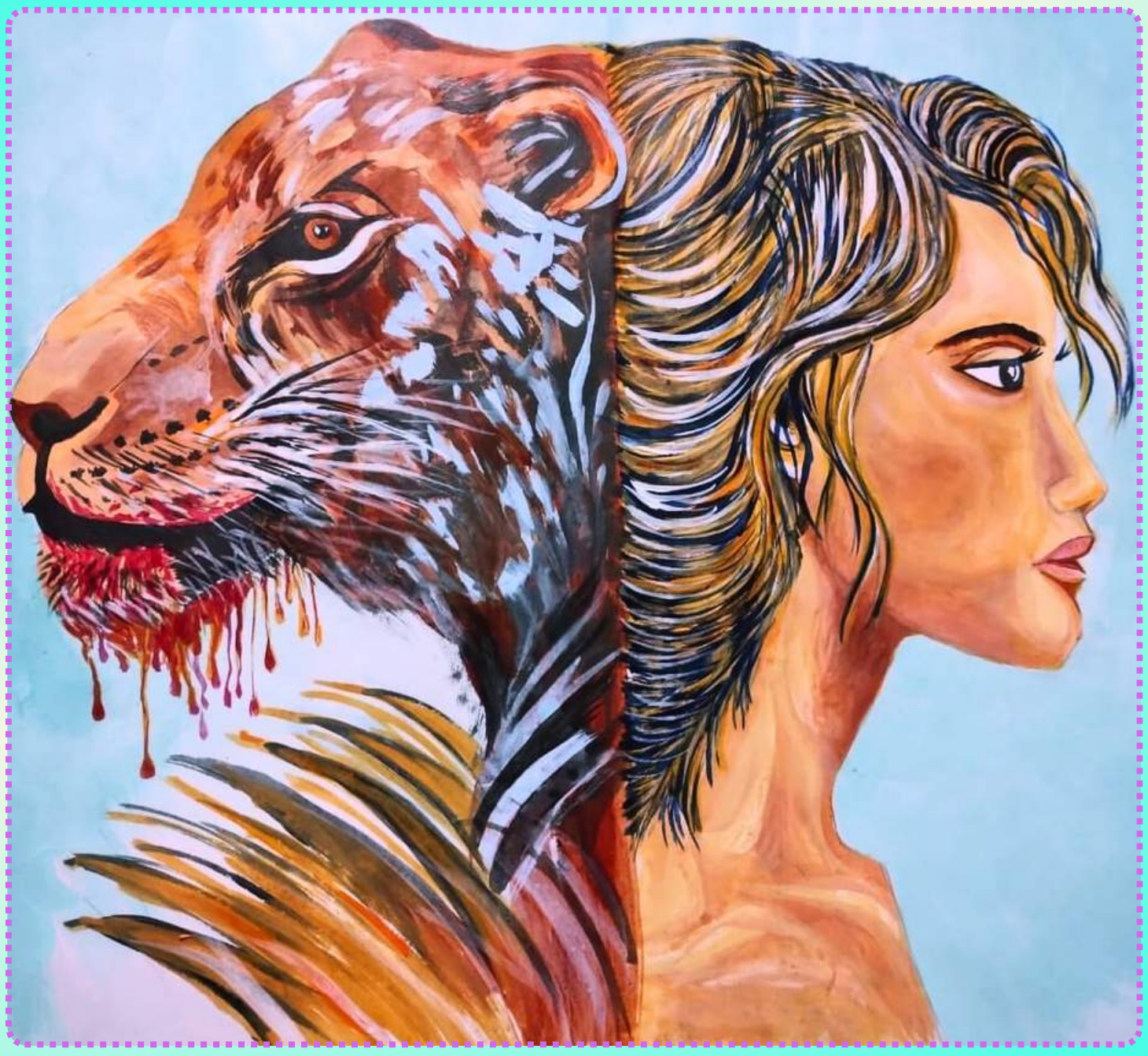
ZOOTOPIA

VOLUME I (2023)



Department Of Zoology

VICTORIA INSTITUTION (COLLEGE)

Our Principal's message

Dear Esteemed Readers,

As we delve into this year's Magazine of the Department of Zoology I invite you to critically engage with the chosen theme – "ZOOTOPIA".

The pages ahead hold not just academic insights but a mirror reflecting the urgent challenges faced by our planet's biodiversity.

In the pursuit of knowledge, let us not shy away from acknowledging the threats our ecosystems endure. Articles within will unravel the disquieting narratives of habitat destruction, species extinction, and the consequences of human activity on the delicate balance of nature.

This edition is not a mere celebration of the wonders of the animal kingdom but a call to action. This magazine will address pressing issues such as climate change, pollution and ecological fragmentation. The stark visuals and thought-provoking articles aim to disrupt complacency, urging us to question our role in the environmental crises unfolding around us.

I extend my appreciation to the editorial team and contributors whose tireless efforts have shaped this magazine. Let this magazine be a catalyst for change, motivating us to rise to the challenges our ecosystem is facing and become advocates for a more sustainable and harmonious coexistence.

Warm Regards

Dr. Maitreyi Ray Kanjilal ,

Principal

Victoria Institution (College)

Dear Readers,

Jim Fowler once said, " The quicker we humans learn that saving open space and wildlife is critical to our welfare and quality of life, maybe we' ll start thinking of doing something about it".

We are delighted to present to you the introductory Volume of e-magazine, "ZOOTOPIA " of our Department.
In today's world humans and wild animals are negatively interacting creating losses in terms of life of both, property and resources and slowly and gradually that will lead to disbalance of our ECOSYSTEM if not checked now. Thus the sole motto of "ZOOTOPIA " is to inculcate the idea of an environment where Man-Animal conflict is to be avoided by allowing the animals to live, feed and breed without fear in their natural habitat.
It's an illuminating chronicle, a milestone not just the e-magazine that will unfold our imaginations, enabling us to express our thoughts, aspirations and provide valuable information.
Through this magazine we are pleased to share with you the articles of our present and past students and intend to bring out the exuberance of their minds.
It unleashes a wide spectrum of creative skills ranging from writing to editing and even in drawing and designing the magazine.

I extend my genuine and heartfelt gratitude to our Principal Madam for her invaluable message that navigated us in the realization of "ZOOTOPIA".

I thankfully acknowledge and heartily congratulate all the editorial members for their tireless efforts, hard work and dedication in working and helping together to publish this launching noteworthy efforts.

Let's all march our journey towards creating an earth where WE ALL CAN LIVE LIKE IT'S HEAVEN ON EARTH.
Looking forward to the valuable feedback from the readers.

Warm regards,
Dr.Debjani Das(Ghosh),
Chief Editor

THE EDITORIAL BOARD

Sub-Editor

"Until one has loved an animal, a part of one's soul remains unawakened." -Anatole France

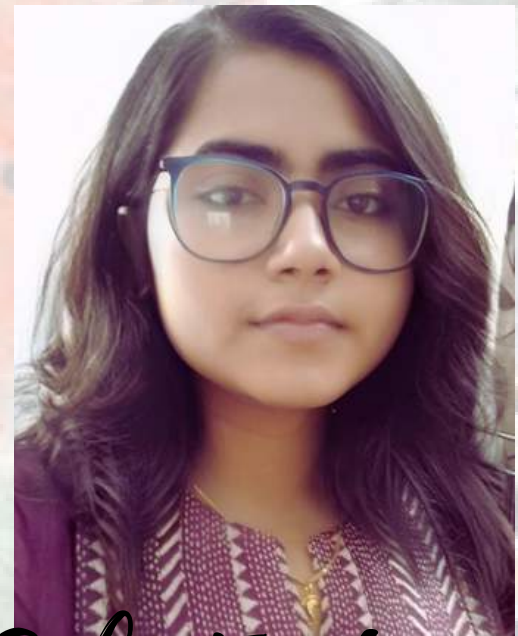
This quote resonates with the name of our magazine which we have fondly named 'Zootopia'. It is because we believe that the co-existence of man and animal will truly bring out the best of nature. Until and unless we show love and compassion towards all kinds of beings we mustn't call ourselves human beings. I think that kind people fully realize the wealth of gentleness and love hidden in the souls of animals.

It was a pleasure to be a part of this wonderful team and be able to create something meaningful that will have a lasting impression on the future generations to come. I thank those who contributed to this magazine and lastly, we will always remain indebted to the readers.

With love,
Ashmita Paul
Sem-3

My heartfelt thanks to all the readers, and spectators who have come to honour their precious seconds to our E-magazine. We are happy to produce our magazine with the name 'Zootopia' as it stands as a block to all the amygdalafied outcomes, of which we all are well aware of. Sadly very few have the rights and the voice to go and talk against the inhuman activities that are prevalent in our world. This E-magazine of our zoology department is just an approach to cast light on this serious issue and encourage the readers to live in harmony with the wild ones, as the name of our E-magazine suggests.

Love,
Shreya Ray
Sem - 3



Sub-Editor

Sub-Editor

It gives us immense joy and satisfaction to finally introduce our e-magazine 'ZOOTOPIA' which is presented by our Zoology department. It includes causes, processes & and preventions of human-animal conflict. The reflection of the student's creativity and achievements is the epitome of the magazine. A lot of effort has gone into the making of this magazine. I am very thankful & and blessed to be a part of this editorial team. We hope all of you will enjoy reading this magazine as much as we have enjoyed making it.

With love,
Shreya Roy
Sem - 3

The best we can do is spread awareness among the readers. Our e-magazine "Zootopia" itself is a reflection of what we can do. We as a team of our Zoology department tried beyond our limits to make this magazine with the help of our professor Dr. Debjani Dasghosh. We showed how human-animal conflict can turn into a malfunctioning to the environment , I hope this one will be inspiring to the gentle one to be humble to wild.

With love
Shreya Sadhukhan
Sem-3

Sub-Editor

It takes a great lot of work to bring everything to a point,presentable to everyone and I'm blessed to be part of this endeavor which we, the students of Zoology graduated department have got. 'Zootopia' is the result of all the work we've jointly completed. We've tried our best to keep up with the topic man-animal conflict, and hope to encourage everyone to act according to our perspectives. Thank you all for spending time in reading our e-magazine.

Love,
Riya Mondal
Sem - 3

Sub-Editor

In the current epoch, the issue of 'Man-Animal Conflicts' has become a focus of great concern in our society. As disciples of Zoology, we have endeavored to lend our voice to this crucial matter. With utmost reverence, we present to you an e-magazine titled 'ZOOTOPIA', a testament to our dedication to this cause.

In our quest to create this enchanting tome, we sought the guidance and wisdom of our esteemed principal, and Dr. Debjani Das (Ghosh) ma'am along with other revered professors of our department. We are forever grateful for their unwavering support and guidance in this endeavor.

With great pleasure, we offer this tome to you, our cherished readers and spectators. Your time is a precious treasure, and we express our deepest appreciation for sharing it with us.

With Love,
Bidipta Dey
Sem - 3 .

Sub-Editor

Sub-Editor

A journey towards something great had never been easy and especially when it comes to a team output it's super difficult to get over all the disagreement of every individual, but finally to come up with the best of our abilities is the greatest achievement for all. The job to make it appealing in possible way and to keep up with the topic was the original challenge. Finally we've been able come up with something presentable and I hope everyone would enjoy our hard work.

Thank you for including this magazine into your reading list

Love,
Chandrima Sarkar
Sem-3.

The title suggesting peaceful coexistence of man and animal, is just the reverse of the topic man and animal conflict. In order to spread awareness, our e-magazine is a small approach that we, students have undertaken to make all civilians believe in Zootopia.

This opportunity to make all our readers ponder over the activities they are directly or indirectly involved in has also sharpen our knowledge, as we find it absolutely rare to reach out to a wider audience. I show my gratitude towards my Chief editor and my professor DD ma'am and last but not the least our respected principal.

We hope you have an engaging time reading our e-magazine. Also if our e-magazine have been of any knowledge to you, we'll be greatful.

Love,
Tanusree Chakraborty
Sem-3

Sub-Editor

Department's message

Human beings always communicate among themselves by their expressions to inherent and nurtured qualities they possess. But sometimes these may occur at intuitive and unspoken manner. The intention to provide a platform for these expressions through written material by college students is very natural need. In the era of internet and electronics publication of e-Magazine has special significance. This is the quickest way of spreading the information to the people who are residing other regions. So, the e-Magazine going to be launched by the Department of Zoology of Victoria Institution (College) is right approach and is an important milestone in this direction.

I extend my heartfelt greetings to all participants, the students, authors, report writers, faculty staff associated in this endeavour. I also express the deep desire that the wonderful, beautiful and creative expressions shall promote better human values, culture and affection among all.

I wish the e-Magazine coordinator and student's team good luck.

Dr. Patralekha Mukhopadhyay,
Associate Professor, Department of Zoology

Dear Students,

I appreciate your endeavor to publish e-magazine from our Department. We are glad to know that the students of our department have also come forward to publish e-magazine like some other departments. I hope that our students will get a chance to express their creativity through this platform. They will show case their talent in extra-curricular activities, which will be encouraged by a large section of viewers. Some students who are weak in curricular activities but strong in extra-curricular activities may get confidence in expressing themselves through this platform. The over-all effect will help in grooming of the students. The students will also gather some team-work experience, which will add value to their future life.

I wish every success of the endeavor.

Best wishes from
Dr. Sucharita Saha,
Associate Professor in Zoology

A magazine is a tool that encourages the students to think and write, thus helping them to develop their thinking power, writing skills and talents. In today's world of modern education, magazine plays a very important role of providing students with information about new discoveries and inventions. They are a potent tool of educating the students about the recent advancements in their field.

A magazine by the Department of Zoology at Victoria Institution College will immensely help the students in the afore mentioned ways. It will be my utmost pleasure to witness the various activities that the students will undertake to develop a departmental magazine. I wish them all the success.

From Dr. Sumallya Karmakar,
Assistant Professor, Department of Zoology

A college magazine is mirror of campus life. It brings in limelight concealed talents beyond limited academic procurements. College magazines are opportunities in disguise , a gallery from which students can express their unheard voice & can accenuate their latent talents. With evolution not only in nature, but in technology as-well, at present " E – MAGAZINE " is more accessible & user – friendly to the readers. Unlimited life-span, high connectivity , unlike printed version , makes E-Magazine more popular.

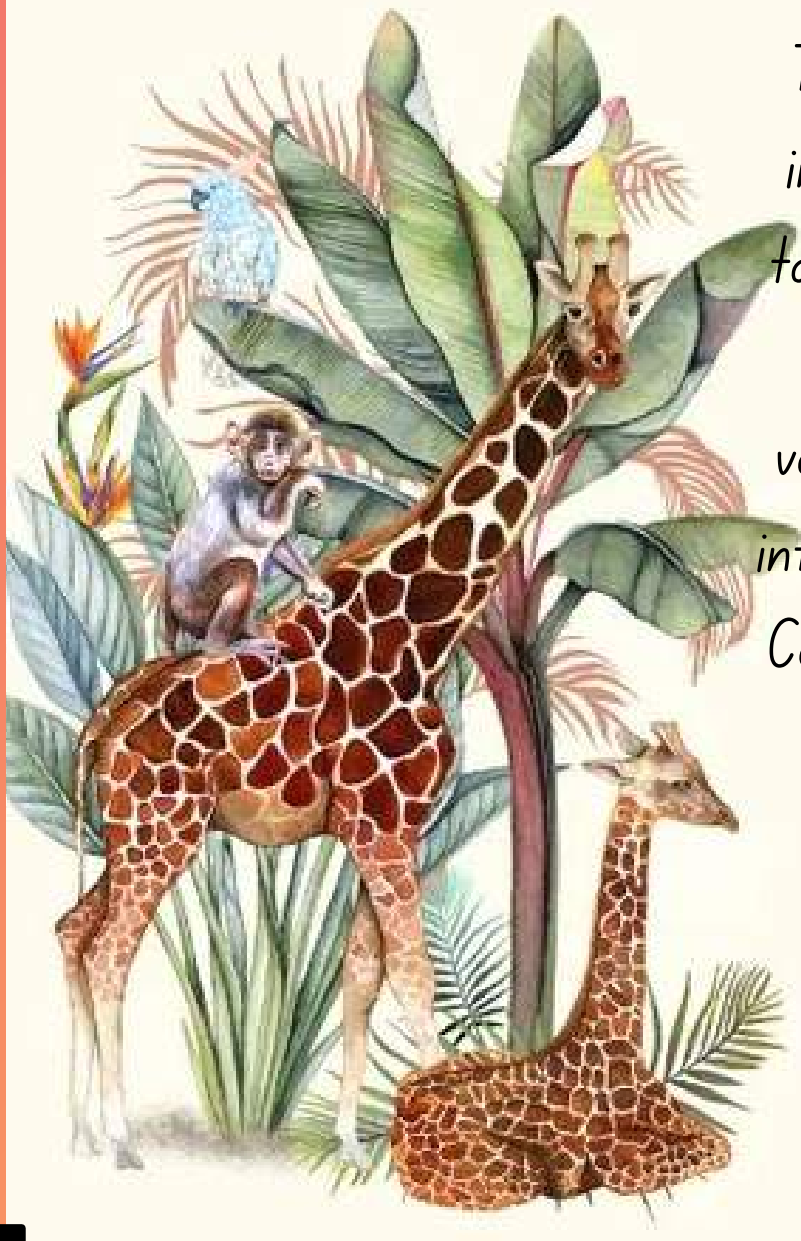
After developing an overview about nature and its jeopardy through their course of study , the young brain can yield ingenious proposals to shield the damage of nature & the magazine can help them to be vocal . The E- Magazine of Zoology Department thus , undoubtedly will be an asset of the department.

From Smt. Suchona Chakrabarti,
Teacher, Zoology Department

Dear Readers,

The Department of Zoology is honoured to present to you Zootopia.

It is more than just a magazine, it is a platform to share and express views to the audience and to educate them about the ongoing conflicts of man and animal. With this magazine we aim to create an environment where both man and animal can coexist peacefully.



This is dedicated to you and to your inner conscience, which beckons you to immerse yourself in the melody of the natural realm. The inaugural volume of Zootopia is a portal to the intricacies of the Man-Animal conflict. Come, venture forth and discover the secrets that await you.

With Love,
The Editorial Board

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ZOOTOPIA

Ankita Kundu,
Pursuing M.Sc in Zoology,
Graduated from Victora Institution (College), 2022

In 2016, Walt Disney took us to an unknown metropolis where different mammalian prey and predator species live together in peace and harmony through the movie Zootopia. Is such coexistence of prey and predator even possible in real life?
Let's dig deep with a simple food chain consisting of producer, primary consumer (herbivore), and secondary consumer(carnivore), provided that all the abiotic factors (temperature, moisture, light, soil-nutrient, wind, etc.) are at the optimum range Supporting the growth of the producer species. In the beginning, the producer population will flourish. Then the herbivore population will scale up lowering the producer Population. After a slight lag, the carnivore population will rise decreasing the herbivore population. Then the carnivore population will crash due to lack of food. In the meantime the producer population will resume its size and the cycle will go on.

Species coexistence occur in many other different forms other than the prey-predator scheme, such as follows:

- ✓ Mutualism: both the participating species are benefited.
- ✓ Commensalism: one species is benefited but the other one is neither benefited nor harmed.

In these above-mentioned examples, it is evident that one species depend upon the other in a variety of way, if any single species gets extinct the other one in a positive association with it will be affected. This also leads us toward the burning issue of "Biodiversity loss". "Biodiversity supported human and societal needs, including food and nutrition security, energy, development of medicines and pharmaceuticals, and freshwater, which together underpin good health. It also supports economic opportunities, and leisure activities that contribute to overall wellbeing." Thus, the global biodiversity crisis is not only impinging the animal world but also the humanity. This crisis cannot be halted if we fail to stabilize the abruptly changing climatic conditions. The whistle was blown long ago but we paid a little or no heed at all. The clock is ticking for us to establish the Zootopia or to ravage mankind.

ZOOTOPIA: A METAPHOR TO MAN - ANIMALS CONFLICT

BIPRA HALDER,
Pursuing M.Sc from University of Calcutta,
Ex-student of Victoria Institution College,2023

Disney's animated film "Zootopia" has earned widespread acclaim not only for its engaging storyline and memorable characters but also for the thought-provoking themes it presents. Beyond the entertaining surface, "Zootopia" subtly tackles critical issues related to animal conditions and the pursuit of conservation solutions. In this article, I will explore how the film serves as a metaphor for these important real-world concerns.

"Zootopia" introduces us to a modern mammalian metropolis where animals of all species live together in what appears to be a harmonious society. This urban ecosystem, a mirror of the animal kingdom, brings to light several significant aspects related to animal conditions and conservation.

First and foremost, the diversity of species in "Zootopia" is akin to the rich tapestry of life on our planet. It underscores the importance of recognizing and appreciating the unique characteristics of each species and respecting their individual needs and behaviours. This diversity is not only visually stunning but also essential for the balance and health of the ecosystem.

The film subtly critiques the stereotypes and prejudices that prevail in society, drawing a parallel with the way we perceive and treat animals. Whether based on predator-prey dynamic or species-specific stereotypes, the movie encourages us to reflect on our preconceived notions and biases.

One of the central themes of "Zootopia" is the discrimination faced by its protagonist, Judy Hopps, a rabbit, as she attempts to break societal norms and prove herself as a capable police officer. This resonates with the challenges animals often encounter due to human-driven factors like habitat destruction, poaching, and climate change. It serves as a call to action for all those working to dismantle barriers and protect the world's most vulnerable species.

The film ultimately emphasizes the importance of inclusivity, cooperation, and harmony among species, highlighting the essential role that all animals play in the functioning of ecosystems. In many ways, this mirrors the efforts of conservationists and environmentalists who work tirelessly to create environments where different species can coexist peacefully.

"Zootopia" also underscores the significance of education and awareness. The character Judy Hopps, who is determined to make the world a better place, exemplifies the power of knowledge and empathy. This mirrors the efforts of conservation organizations to educate the public about the importance of protecting natural habitats and the incredible diversity of species that inhabit them.

CONCLUSION

In conclusion, "Zootopia" is more than just a charming, animated film; it's a metaphorical journey into the realms of animal conditions and conservation. Through its engaging storytelling and memorable characters, it encourages us to rethink our relationship with animals and our role in preserving the environment. By embracing diversity, challenging stereotypes, and fostering cooperation, we can indeed create a world that mirrors the harmonious society depicted in the city of "Zootopia."

Man -Animal Conflict: A BRIEF OVERVIEW

Ankita Sarkar ,
Pursuing M.Sc Zoology from Maulana Azad College,
Graduated from Victoria Institution (College) 2022

What is man-animal conflict?

It refers to the struggles that arise when the presence or behaviour of wildlife poses actual or perceived direct, recurring threats to human interests or needs, often leading to disagreements between groups of people and negative impacts on people and/or wildlife

Wildlife can threaten people's safety and livelihoods, which can lead to conflicts between groups of people over how to resolve the situation; experts call this 'human-wildlife conflict'.

Human-wildlife conflicts are becoming more frequent, serious and widespread as human populations grow and habitats are lost.

Effectively managing human-wildlife conflicts protects communities, stops conflicts from escalating, builds trust in conservation and avoids retaliation against wildlife.

Human-wildlife conflicts have unique ecological, cultural, social, historical, physical, economic and political characteristics which strategies to manage conflicts must consider.

The need for elevating this issue globally and unlocking partnerships and resources to reduce human-wildlife conflict spurred the creation of a new WWF-led report- A Future for All: The need for human-wildlife coexistence. The outcome of an international and multi-organizational collaboration, this report delves into the complexities of human-wildlife conflict, ways to sustainably manage and reduce it, and move towards coexistence with wildlife—all while engaging diverse partners through a call to action.

Why is human-wildlife conflict on the rise?

As human populations and demand for space continue to grow, people and wildlife are increasingly interacting and competing for resources, which can lead to increased human-wildlife conflict.

Along with other threats, human-wildlife conflict has driven the decline of species and is pushing others to the brink of extinction. However, the human-wildlife conflict issue has far-reaching impacts beyond the wildlife and communities immediately affected by it. With human-wildlife conflict centred around the interaction between wildlife and humans, human-wildlife coexistence is strongly linked and important to sustainable development activities. If not effectively managed, human-wildlife conflict has the potential to negatively affect these activities and conservation much more broadly.

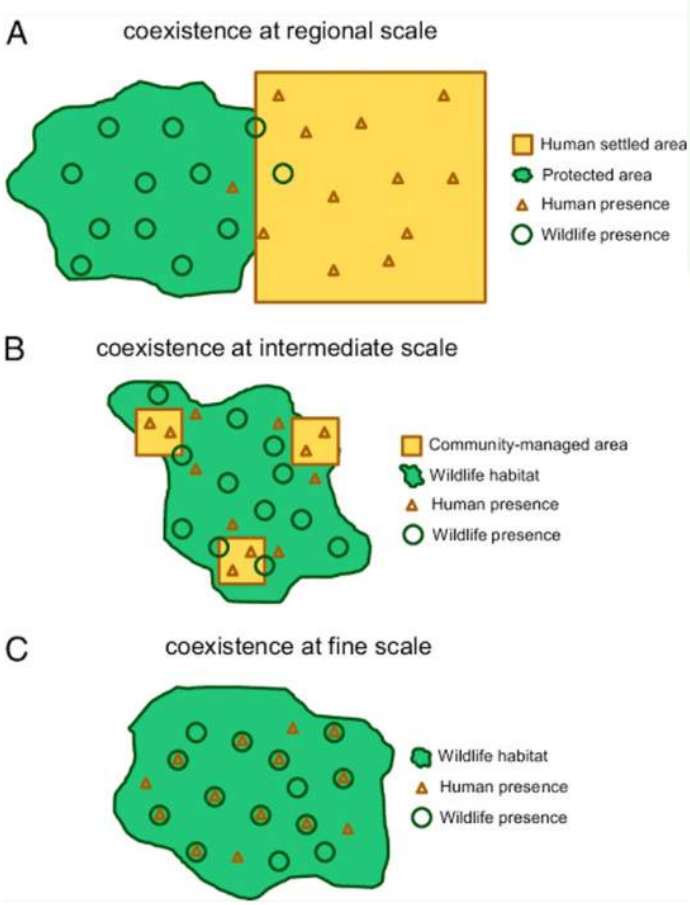
Wildlife can pose a direct threat to the safety, livelihoods and well-being of people. For example, when elephants forage on crops, seals damage fishing nets or jaguars kill livestock, people can lose their livelihoods. Retaliation against the species blamed often ensues.

The term human-wildlife conflict has traditionally been applied only to these negative interactions between people and wildlife, but this implies deliberate action by wildlife species and ignores the conflicts between groups of people about what should be done to resolve the situation.

The IUCN Species Survival Commission (SSC), Human-Wildlife Conflict & Coexistence Specialist Group defines human-wildlife conflict as struggles that emerge when the presence or behaviour of wildlife poses an actual or perceived, direct and recurring threat to human interests or needs, leading to disagreements between groups of people and negative impacts on people and/or wildlife.

WAY FORWARD

- The most widespread methods for lessening human-wildlife conflict come in the form of mitigation, or finding ways to keep wildlife out of areas with high human population or agricultural density.
- There is a need for education and awareness among the masses so that they are sensitised about the human-animal conflict, Then, mitigation will evolve away from short-term symptom fixes towards long-term sustainable solutions to prevent conflict.
- Ensuring that humans and animals have adequate space to thrive is the basis of human-wildlife conflict resolution.
- Protecting wild lands and natural habitats is key, but so is creating buffer zones between wild and urban areas.



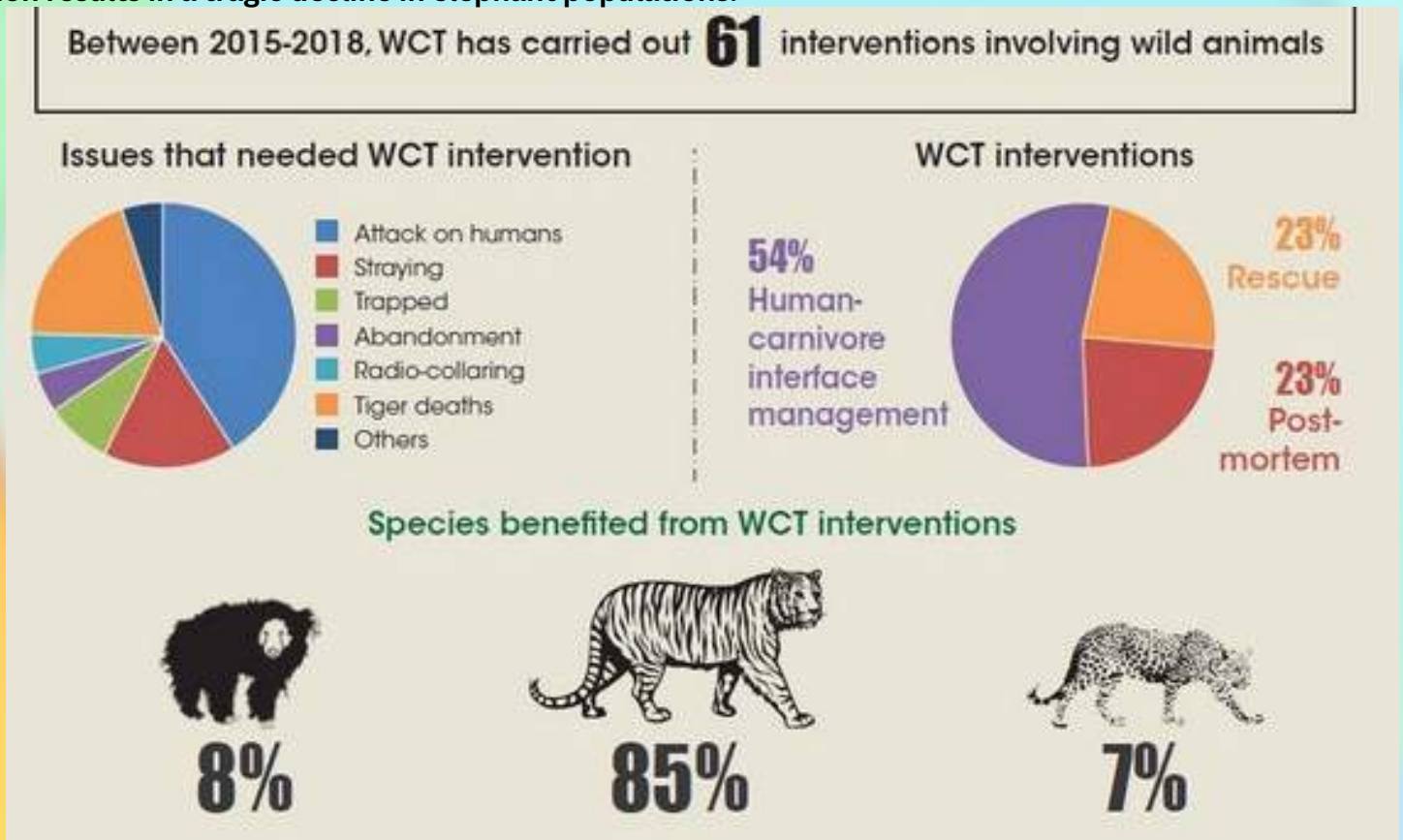
Schematic diagram of human wildlife conflict

The Escalating Human-Animal Conflict: An Urgent Call For Harmonious Coexistence

Suchismita Das,
Graduated from vic, 2023

In the grand tapestry of existence, a delicate balance is maintained between all creatures—great and small, beast and man. This intricate dance of coexistence is a testament to life, a symphony of interdependence. Yet, this symbiosis often disbalances on the precipice of conflict, as the dance of life unfolds its complex play of shadows. The issue of animal-human conflict is a pressing concern that has increasingly risen to the forefront of environmental discussions in recent years. This escalating conflict is frequently ignited when human activities, expanding at an alarming rate, encroach upon territories that were previously left undisturbed, territories that are home to a diverse array of wildlife. This intrusion disrupts the delicate balance of the ecosystem, leading to encounters that are often fraught with danger and inflict harm on both parties involved.

As the trees fall and forests shrink, the animals that call these vibrant ecosystems home are forced into a state of perpetual displacement. The once harmonious coexistence between humans and animals gives way to a desperate scramble for survival. The ramifications of human-animal conflict are profound and far-reaching, inflicting detrimental effects on both humans and wildlife. Recent most prominent examples can be found in the interactions between humans and elephants in Africa and Asia. With the continuous expansion of human settlements into the natural habitats of these majestic creatures, encounters between the two species are becoming increasingly frequent and problematic. Elephants, in their search for food, often end up trampling and destroying crops, thus severely impacting the livelihoods of local farmers who depend on these agricultural lands. In response to this threat to their livelihood, farmers may resort to harmful measures, such as injuring or even killing these elephants to protect their crops. This retaliatory action results in a tragic decline in elephant populations.



Human-animal conflict is a serious issue in India, where many people live close to forests and share the same resources with wildlife. On January 25, 2020, a 42-year-old woman was killed by a tiger in the Brahmapuri forest division of Chandrapur district, Maharashtra. The woman was attacked by the animal while she was out working in her fields. On December 21, 2019, a six-year-old tigress named Avni was shot dead by a private hunter's son for allegedly killing 13 people in Maharashtra. The killing sparked outrage and protests from many conservationists and animal lovers The list goes on. In this crisis, we are confronted with the fragility of our shared existence. The delicate balance that once held our ecosystems together is unravelling before our very eyes. As we witness the loss of countless species and the erosion of biodiversity, we are compelled to question our role in this unfolding tragedy.

The Silent War

Consider the silhouette of a stag in the moonlight, a symbol of nature's majesty. The purity of this image is tinged with the sorrow of encroaching human boundaries. The increase in human populations, there is a greater demand for land, food and water. In this crisis, we are confronted with the fragility of our shared existence. The delicate balance that once held our ecosystems together is unravelling before our very eyes. As we witness the loss of countless species and the erosion of biodiversity, we are compelled to
question our role in this unfolding tragedy. Wild animals may raid crops or prey on livestock, causing economic losses for farmers. In
response, humans may resort to retaliatory killings or the use of lethal methods to protect their livelihoods. To reduce these conflicts, it is essential to develop strategies that promote coexistence and provide alternative means for wildlife to access resources without encroaching on human settlements. On the other frontier animals are battling with poachers, who are destroying their physique and right to live for mere money and destroying the harmony. There is the roar of the lion, once echoing through the vast savannah, a
testament to the wild and untamed spirit of nature, is now just some dollar value away for its long lustrous mane for the humanity. The other species is now in a battlefield with human species for survival.

Awakening the Harmony Within

As we reflect on the crisis between humans and animals, we must also turn our gaze inward. This requires a collective effort to cultivate compassion, understanding, and respect for all living creatures. By embracing a philosophy that acknowledges our shared existence, we can find ways to coexist peacefully, preserving the biodiversity that enriches our planet. As philosopher Martin Buber said, "An animal's eyes have the power to speak a great language." Let us listen to this language and strive to build a world where humans and animals can dance together in harmony. We must recognize that our fate is intertwined with that of the animals we share this planet with. By awakening the harmony within ourselves, by nurturing a sense of reverence for all life, we can begin to heal the wounds we have inflicted upon the Earth. Through collective action and individual choices, we can forge a path towards coexistence and restoration.

In conclusion, the animal-human conflict is a complex, multi-faceted issue that warrants immediate and focused attention. It's a problem that cannot be solved overnight, and it requires concerted efforts from all stakeholders, including governments, conservation organizations, and local communities. By embracing a comprehensive and empathetic approach, it is indeed possible to mitigate these conflicts and pave the way for a harmonious co-existence between humans and animals, one where we respect and value each other's right to share this planet.

MAN- ANIMAL CONFLICT: A SYNOPSIS

MEGHAMITRA GHOSH, SEMESTER 5, ZOOLOGY HONOURS.

What is meant by 'Human-Wildlife Conflict'?

According to World Wide Fund for Nature (WWF), 'Human-Wildlife Conflict' is defined as "any interaction between humans and wildlife that results in negative impacts of human social, economic or cultural life, on the conservation of wildlife populations, or on the environment."

Who is impacted due to 'Human-Wildlife Conflict '?

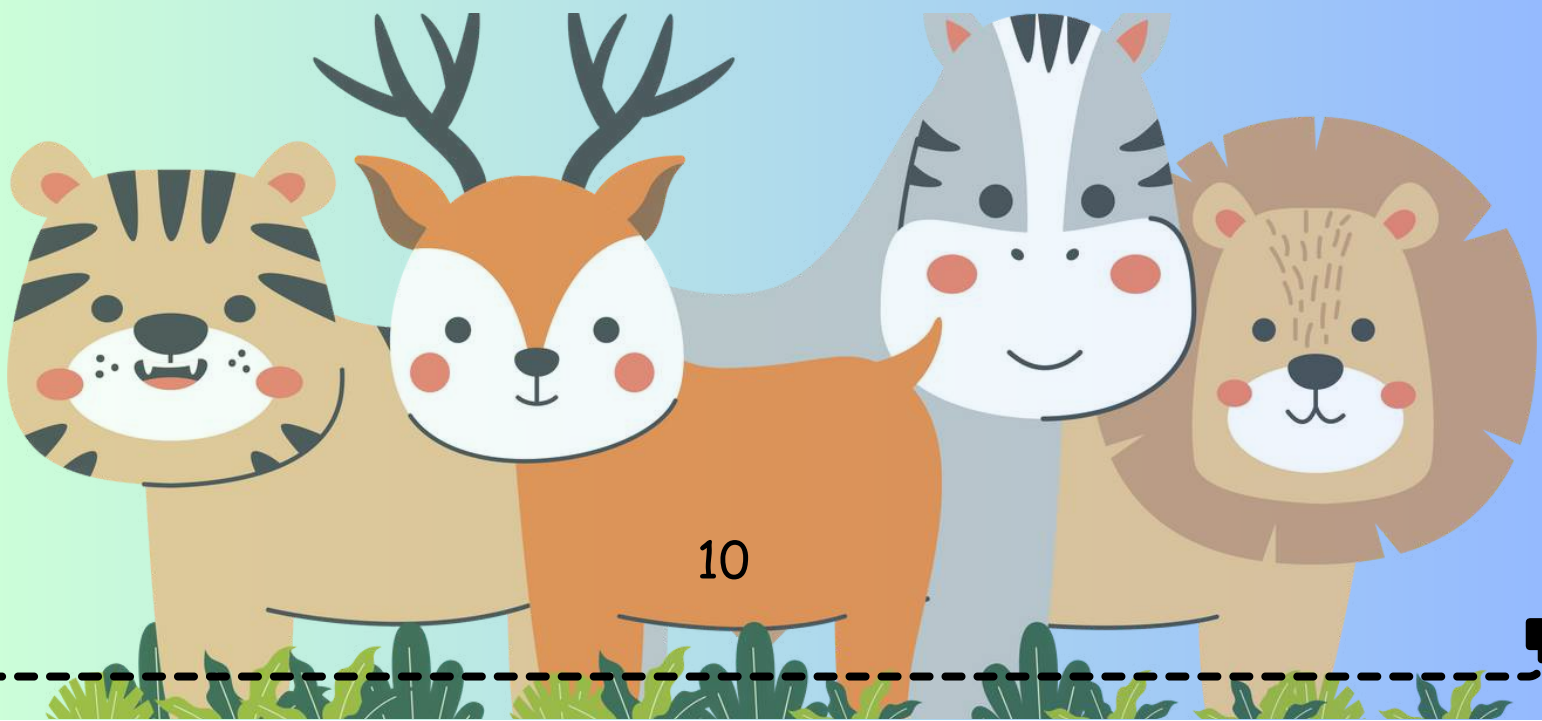
Communities living near the forest area are mainly and directly impacted by human- wildlife conflict.
This eventually leads to decline and potential eradication of species, communities can experience financial loss, threats to health , livelihood, safety, food security.
In addition to direct losses to communities, human – wildlife conflict indirectly impacts people all over the world as it affects the supply chain, agricultural goods production thereby fetching low income and hampering economy.

Few latest cases of 'Human-Wildlife Conflict' :-

1. Among tigers, too, 29 were killed by poaching between 2019 and 2021, while 197 tiger deaths are under scrutiny.

2. Tigers killed 125 humans in reserves between 2019 and 2021. Maharashtra accounted for nearly half of these deaths, at 61.

Tigers	2021-2022	2020-2021	2019- 2020
Human Killed by Tigers	31	44	50
Natural Deaths of Tigers	4	20	44
Poaching Deaths of Tigers	4	8	17
Unnatural Deaths of Tigers (excluding poaching)	2	0	3
Tigers death under scrutiny	104	71	22
Seizure	13	7	10



What is the solution to the problem?

- Awareness: The communication and interaction between the forest department and the locals has to be improved so that they can be sensitised about the issues and animals.
- Wildlife corridors: Corridors allow animals to freely move from one habitat patch to another without crossing human-caused barriers which can put animals, and potentially humans, in danger.
- Community Participation: Effective planning and implementation of such measures requires consideration of good principles in community-led conservation, in collaboration with the communities affected.
- Increase in Protected Areas: To conserve the animals and avoid any human-animal interaction more protected areas need to be developed by the Government.
- Other measures: Includes barriers (fences, nets, trenches), guarding and early-warning systems, deterrents and repellents (sirens, lights, beehives), translocation (moving wildlife), compensation or insurance, providing risk-reducing alternatives, as well as managing tensions between stakeholders involved in these situations.

What are the steps taken by the government?

- **Wildlife Protection Act 1972:**

  It lays down the rules and regulations for the conservation and protection of Animals in India.

- **Protected Areas and reserves:**

  There are 106 National Parks, 567 Wildlife Sanctuaries, 105 existing Conservation Reserves.

- **Project Tiger:**

  It was launched by the Government of India in 1973, initially, the Project started with 9 tiger reserves, at present there are 53 tiger reserves in India.

- **Operation Thunderbird:**

  Wildlife Crime Control Bureau (WCCB), Ministry of Environment, Forest and Climate Change, coordinated Operation in India to fight against wildlife crime.

- **Monitoring the Illegal Killing of Elephants (MIKE):**

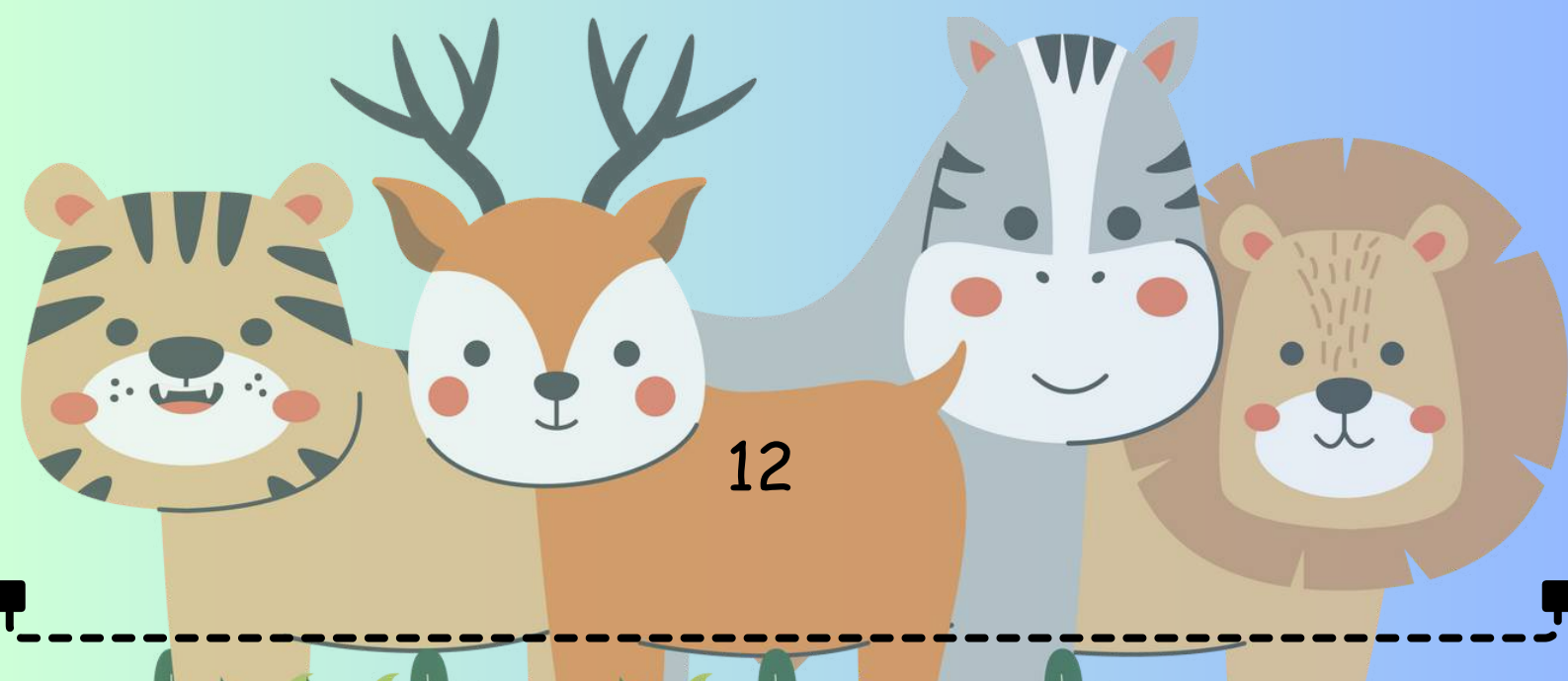
It was established by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) at the tenth Conference of the Parties in 1997. It measures the levels, trends and causes of elephant mortality, providing an information base to support international decision-making related to conservation of elephants in Asia and Africa.

- **Plan Bee:**

It is adopted by the Northeast Frontier Railway (NFR) which is a unique method to keep elephants away from railway tracks and plans are afoot to implement it all over the country to save the lives of elephants

Conclusion

Human-wildlife conflict will exist as long as the human population keeps increasing. However, with proper management strategies, this problem can be solved. Human-wildlife conflict management strategies can create opportunities and benefits not only for biodiversity and impacted communities, but for society, sustainable development, production, and the global economy at large. We also ask for global cooperation, concerted actions, and resources to address the issue at the scale required.



HUMAN-ANIMAL CONFLICT ON A SPECIES-BY-SPECIES BASIS

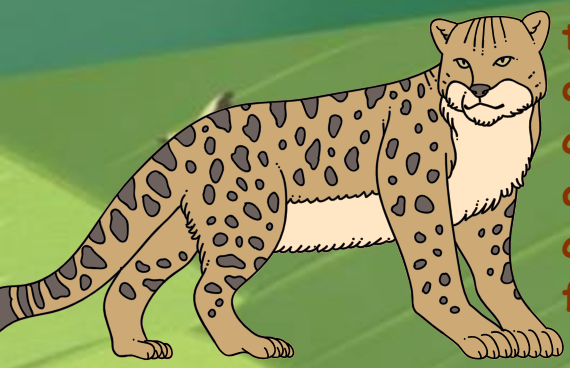
SURAVI ROY, M. Sc IN ZOOLOGY

ASSISTANT TEACHER, GRADUATED ZOOLOGY HONS. VIC, 2012

Human-Leopard Conflict:

Human-Leopard conflict refers to the interactions and conflicts that occur when humans and leopards come into contact, particularly in regions where leopards share habitats with human populations. Human-Leopard conflict levels, in terms of human injury and loss, as well as livestock predation, have exceeded in many areas in India. Across India there are sporadic reports of human beings injured or killed by a leopard (most frequently in the tea gardens of West Bengal), in rare instances, a confirmed man-eater may stalk an area for a period of time. In Garhwal, the situation is both precarious and rapidly deteriorating. Man-eating in this region, instead of being an occasional occurrence, has become alarmingly regular. In the hills of Garhwal, Kumaon, and Himachal Pradesh, the leopard *(Panthera pardus)* is feared above all predators.

Unlike the tiger, the leopard is characterized by its flexible diet and its high species, and can live in highly degraded habitats, in close proximity to human settlements. They are found on the fringes of large cities and sometimes individual leopards enter various small towns. While living in proximity to humans, leopards attain a level of familiarity and extreme boldness that even a man-eating tiger rarely does. In Garhwal, leopards are exposed to an increasing level of biotic pressure, made worse by deforestation, habitat fragmentation, and the depletion of prey species like goral, barking deer, wild boar, and langur due to hunting. Together, these factors have led leopards to prey on livestock, and, with greater frequency , and when opportunity allows, women and children.



From various survey we can understand the patterns of these killings, a majority of the killings have taken place in the rainy and winter seasons, when a denser cover of vegetation allows leopards to live closer to humans. These coincide with activities such as children going to or returning from school, women coming from or going to cultivated fields or to forests and women and children going to the toilet.

The majority of cases occurred in degraded forest or scrub lands. Other than these killings there are various other challenges and risks:

1. Livestock Predation –

Leopards may prey on domestic animals, such as cattle, goats, and dogs, causing economic losses for livestock owners.

2. Crop and Property Damage -

Leopards can enter agricultural areas, damaging crops and property, which leads to financial losses for farmersand homeowners.

Fig- Leopard got traped in a cage kept at a children park in Alipurduar

Fig- Leopard in agricultural area.

1. Awareness programmes in affected regions to encourage the following-
   a. Moving about in groups.
   b. Avoiding or reducing movements away from human settlements at certain times of the day.
   c. Making noises when approaching areas of dense vegetation.
   d. Avoid hunting or consuming the leopard's prey species.

2. "Encounter Training" programmes to teach people how to react in encounters with leopards.

3. Reforestation activities to enhance the natural prey base.

4. Alternative source of energy, thus reducing biotic pressure on surrounding forests, and indirectly reducing the number of Human-Leopard encounters.

5. Creation of toilet facilities.

6. Compensation for injuries/losses to both humans and livestock.

7. Education programmes that teach people about the leopard, its habits and its needs. Efforts to address the Human-Leopard conflict often involve a combination of strategies, such as building secure enclosures for livestock, implementing deterrence methods to keep leopards away from human settlements, and raising awareness about coexisting with leopards in their natural habitats. Finding ways for humans and leopards to share the same landscapes peacefully is crucial for conservation and human safety.

Human-Barking Deer Conflict :

Human-Barking Deer conflict can arise in areas where their habitats overlap. Due to habitat loss and fragmentation by human activities, barking deer abundance is decreasing, which may even ultimately lead to its extinction. This in turn might negatively affect local ecosystem such as the abundance of the endangered common leopard, for which barking deer is the main prey species. We therefore need to know factors affecting barking deer either by direct sighting or by any evidence of its indirect presence observed through various surveys. We measured main four ecological drivers such as forest management regime, microclimate, distrurbance, and food resources, which include habitat characteristics in spots where barking deer was present, and in randomly selected spots. We found that elevation, slope, distance from the settlement, presence of tree species, depth of leaf litter and percentage cover of leaf litter were most significantly affecting its presence. These results can serve as guidelines for local authorities to prevent a decline in the abundance of barking deer. Barking Deer may damage crops, gardens, or forest regeneration, leading to conflicts with humans. This can result in efforts to deter or manage the deer population or protect crops through fencing, repellents, or habitat conservation. Balancing the needs of both species and finding sustainable solutions is essential to minimize conflicts.

Human-Reptiles Conflict :

Reptiles of all varieties- Snakes, scorpions, crocodiles, lizards have been recorded for their attacks on human. Snakes and scorpions are involved in thousands of encounters with humans every year. Crocodiles have developed a reputation for man-eating. The giant crocodile is known to be especially aggressive and prone to man-eating. Humans living in and around the Sundarbans suffer the most from crocodile attacks.

Human-Snake conflict refers to the interactions and conflicts that arise when humans and snakes come into contact, particularly in regions where venomous snakes are prevalent. These conflicts can lead to various challenges and risks-

- **Safety Concerns:**

  Venomous snakes, when encountered in human inhabited areas, pose a direct threat to human safety. Snakebites can lead to severe health consequences and even death.

- **Livestock and Crop Damage:**

  Snakes may prey on small livestock or create disruptions in agricultural areas, leading to economic losses for farmers.

- **Fear and Misperceptions:**

  The fear of snakes is widespread in many cultures, leading to negative perceptions and a tendency to kill snakes on sight, which can have ecological consequences.

Fig- People caught Python in residential area of Alipurduar

Efforts to address Human-Snake conflict include snake bite prevention and treatment measures, public awareness campaigns to promote snake conservation and reduce fear, and habitat preservation to minimize human-snake interactions. These efforts aim to find a balance between human safety and the conservation of snake species.

Human-Birds Conflict :

Human-Bird conflict refers to the interactions and conflicts that occur between humans and various bird species often in areas where human activities and bird populations intersect. These conflicts can take different forms:

- **Agricultural Damage:**

  Birds like crows, sparrows, and starlings can damage crops, resulting in economic losses for farmers. Peacocks damage young shoots of newly planted crops. Cranes and water birds forage on agricultural crops, passerines, parakeets damage fruit orchards. Traditional methods of reducing conflict are generally acceptable to farmers. These involve scaring away offending species at the critical time of sprouting and ripening. The argument of bird trappers and bird traders that their activities reduce crop damage is not valid because their catch comprises a negligible share of the population.

- **Avian Safety Hazards:**

  Birds, particularly large species like geese or vultures, can pose safety risks at airports, leading to bird strikes with aircraft which sometimes results in human injuries or death and damage to aircraft.

- **Nesting in Urban Areas:**

  Some bird species nest in urban environments, leading to conflicts with humans when their nests are seen as a nuisance or hazard.

- **Transmission of Diseases:**

  Certain bird species, such as pigeons, can transmit diseases to humans, leading to health concerns.

Efforts to mitigate Human-Bird conflict involve a range of strategies, including implementing bird-friendly agricultural practices, bird control measures at airports, and humane methods to manage urban bird populations. Balancing the needs of both humans and birds is essential to reduce conflicts while conserving avian species.
Efforts to address Human-Animal Conflict often involve implementing strategies to mitigate these issues, such as creating wildlife corridors, promoting sustainable land use practices, and using deterrents to protect crops and livestock and also focus on coexistence strategies, such as electric fencing, scare tactics, or providing alternative food sources for wildlife. Public awareness and education are vital in fostering tolerance and understanding. Many successful programmes have demonstrated that humans and animals can coexist peacefully with proper planning and community involvement. It is an important issue at the intersection of environmental conservation and human livelihood. Human-Animal conflicts often raise complex ethical and legal questions. Decisions regarding the management of conflict, such as culling, relocation, or the introduction of non-lethal deterrents, are subject to debate. Balancing the rights and interests of wildlife with those of human populations requires careful consideration and the development of sound policies.

Human-Animal Conflict is a pervasive and intricate issue that involves poaching, habitat degradation, and climatic change, agricultural conflicts, urbanization, infrastructure development, transportation hazards, human health concerns, and the challenges associated with conservation efforts all contribute to the complexities of this problem. Yo address human-Animal conflicts, it is essential to adopt a multi-faceted approach that considers the welfare of both humans and wild animals, promoting coexistence, and respecting ethical and legal principles. Only through a comprehensive understanding of the various dimensions of this issue we can find sustainable solutions that benefit both Humans and Wild Animals.

ECOPSYCHOSOCIAL ASPECTS OF HUMAN- TIGER CONFLICT

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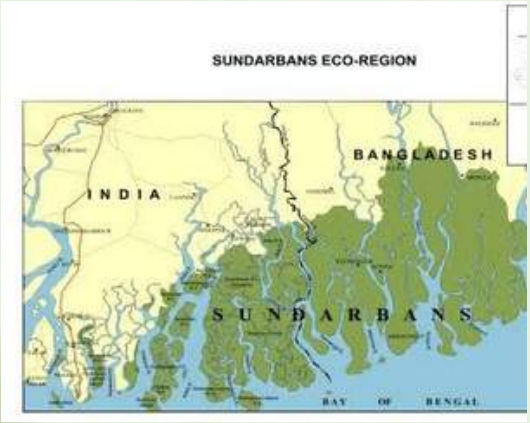
INTRODUCTION

Human – tiger conflict (HTC) is a serious public health issue in Sundarban Reserve Forest , India. HTC is a continued concern for the significant mortality and morbidity of both human and tiger population. This is the first comprehensive report on Sundarban tiger-human conflicts and their impact on widows whose husbands were killed by tigers.In this article, the situation analysis of HTC and the aftermath of the incident including bereavement and coping , the cultural stigma related to being killed by a tiger and the consequence discrimination ,deprivation, and social rejection , and the impact on the mental health of the tiger-widows.The Sundarban is inhabited by The Royal Bengal Tigers *(Panthera tigris)* , many other large carnivores and other wildlife for a long period . The existence of human habitation close to the core and buffer areas of the forest is a remarkable feature of this study area. But recently conflicts between wildlife and human beings, especially with the Royal Bengal tigers are increasing surprisingly (Chatterjee, 2023). The remarkable growth of the human population in the forest is one of the reasons for this. Such conflict is not only causing a life threat to humans, sometimes tigers are killed by the furious human mob. For more than the last two decades, many such incidents have happened in Sundarban and these incidents were uneven throughout the period (Das, 2018). Global warming is also increasing such threats, along with that the threat of illegal hunting and poaching are seriously disrupting natural habitat of the wildlife(Qureshi et al., 2023).The geographical, biological ,political,social,financial, cultural, and traditional factors influence the conflict or co-existence between people and wildlife (Ruda et al ., 2018).

GEOGRAPHICAL DESCRIPTION

Located on the delta of the Ganges , Brahmaputra, and Meghna rivers on the bay of Bengal ,the Sundarban mangrove forest is the largest Mangrove forest in the world,consisting primarily of halophytic plants .It is intersected by a complex network of tidal waterways ,mudflats and small islands of salt-tolerant mangrove forests (UNESCO,W . H. 2023). Its major part (almost 60%) is under the territory of Bangladesh and the rest is located in the South 24 Parganas district of West Bengal State in India.This forest is also known as ' Mangal vegetation', ' intertidal forest','tidal forest', and " Bada Bon " (Indian – Bengali name) which significantly points to Sundarban mangrove forest .

The Sundarban is a group of low-lying islands spreading from the South 24 Parganas district of West Bengal , India to Bagerhat in southern Bangladesh .It is the world's largest deltaic plain, which is apart of the Ganga Brahmaputra Delta (Roy and Dhar , 2021) . Out of the total 10,000 sq. km. area of Sundarban ,only approximately 4000 sq.km. area is under Indian territory. It is the largest mangrove forest in the world; it is believed that the area was named Sundarban because of its extensive influence of Sundari trees, the mangrove spieces that dominates in the region (Chatterjee,2018) .



The main forest-based livelihood groups are described below

Fishing are the main livelihood activites for coastal line , respectively . Around 2,069 km square of the water tracks inside the Reserve Forest are used for river fishing ,using traditional methods . Fishing is always accompanied by occupational dangers , either from tiger or crocodile attack or from climatic events [41].

Wood cutters and firewood : (Golpata – Nipa fruticans and Hental-Phoenix paludosa) collectors. Locally they are called Kathuria and Kathkurani , respectively . Officially , approximately 5 % of the population is involved in wood collection ; usually a team of 6-10 wood cutters are lead Boulay into the forest . A Boulay is a man traditional expertise , they are also believed to have supernatural powers to protect the work area so that tiger cannot enter into this enchanted territory.

Honey collectors : (from the beehives of Apis indica). This is a seasonal group activity . Usually a team of 8-10 members is lead by a Moulay (also called Moule or Mouli) into the forest . As with the Boulay , the Moulay is also believed to possess supernatural powers Honey collection is highly dangerous as it takes place directly in the tiger habitat.

Crab collectors ; The estuarine mud crab Scylla serrata (locally called bada – kanckara - mangrove crab) is an edible species distributed across the mudflats of the Sundarban forest and has a good marked demand , both locally and internationally [46] . The crab collectors are often taken by tigers when they are concentrating on their catch [48]

Shell collectors: Locally they are called Chunari . Snails , clams , and giant oysters are distributed around the forest floor and mud flats.

Bonobibi and the Tiger God

The people of Sundarban , both Hindus and Muslims together , have a strong faith in the folk culture of Bonobibi (the Queen of the forest) , as the guardian deity of the forest together with the Tiger God under the name Dakkhin Ray (Lord of South) . Sundraban islanders perceive Bonobibi as the unified symbol of the forest and the people ,and she stands beyond any caste,class,and religion [51]. Before entering the forest for fishing ,harvesting honey, or wood cutting , it is obligatory to offer puja and pray to the Deity asking to keep them protected from tigers.The people of Sundarban have keep faith in this Deity to keep them safe and order their lives,and this is reflected in their day-to-day cultural rituals and social discourses

DISCUSSION

There are currently 245 million widows in the world ,of which 42.4 million are from India , ie, 10% of the India's female population [64]. If the husband's death was sudden and unnatural,it also conveys social stigma and thus acts as a double -edged sword in ostracizing the widows, leading them to becoming social outcasts. The cultural stigma attached to having been killed by a tiger exacerbates an already difficult situation for those widowed women .

Their status as tiger -widows impacts on all aspects of their life,psychological well -being ,mental health ,physical health, economic security ,and social identity.

CONCLUSION

It is a matter of uncertain speculation as to whether the problems experienced by the tiger-widows of Sundarban will attract any attention in a national or international forum,even given the context of increasing HTC (human tiger conflict). Increasing HTC could and should inform local conservation strategies ,having it does ,seriously negative impacts on both humans and tigers . Local community involvement , especially their attitudes , perception and some tolerance to loss are also important factors to consider in tiger conservation measures.

MAN- ELEPHANT CONFLICT IN INDIAN PERSPECTIVE: A BRIEF INSIGHT

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INTRODUCTION

Elephants are large mammals of the family Elephantidae and the order Proboscidea. Two species are traditionally recognised, the African elephant (Loxodonta africana) and the Asian elephant (Elephas maximus). All elephants have several distinctive features, the most notable of which is a long trunk or proboscis, used for many purposes, particularly breathing, lifting water and grasping objects. Their incisors grow into tusks, which can serve as weapons and as tools for moving objects and digging. Elephants' large ear flaps help to control their body temperature. Their pillar-like legs can carry their great weight. Elephants are herbivorous and can be found in different habitats including savannahs, forests, deserts and marshes. They prefer to stay near water. They are considered to be keystone species due to their impact on their environments. Other animals tend to keep their distance where predators such as lions, tigers, hyenas, and wild dogs usually target only the young elephants (or "calves"). Asian elephant comes under endangered species as per the IUCN.

One of the biggest threats to elephant populations is the ivory trade, as the animals are poached for their ivory tusks. Other threats to wild Asian elephants include habitat destruction. As Asian elephants are herbivorous and require a rich forest for their survival, the deforestation forcing them to enter the human population for searching adequate amount of food which has been creating the Human-Elephant conflict.

Probable causes of Human-elephant conflict (HEC)

India is home to the world's largest population of Asian elephants, a species listed as endangered, with declining populations across its home range of 13 countries. Their forest habitats are being eroded by agriculture and infrastructure, as India's growing population of almost 1.4 billion people expands further into wild spaces.

The country has over 100 national parks and around 30 elephant reserves,but many of India's 30,000 elephants live outside these protected areas and have less and less habitat to roam in search of food. That is leading them into increased contact with humans. One of the biggest challenges in India is the fact that we have less than 5% of land set aside for wildlife, and there are millions of people who live adjacent to our protected areas or inside.

Degradation of forest areas due to increasing human pressure tend towards HEC. When the interactions between elephants and human beings become very close certainly there would be a conflict between man and elephant.

Impact of Human-Elephant conflict in India

Between 2018-19 and 2020-21, 222 elephants were killed by electrocution across the country, 45 by trains, 29 by poachers and 11 by poisoning.

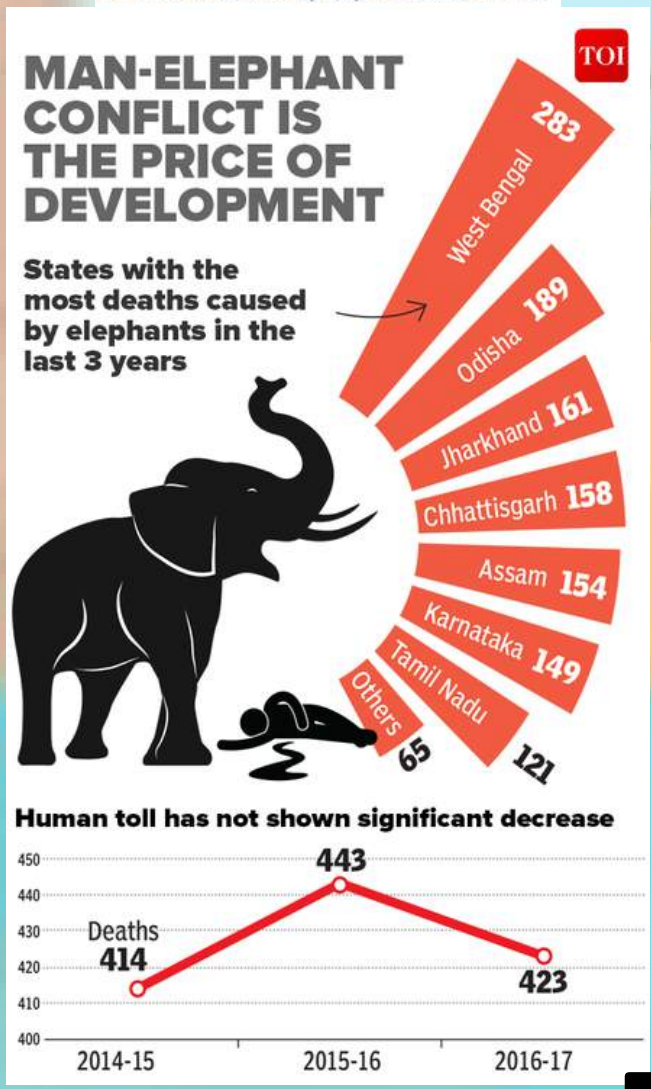
Among human casualties of conflict with animals, elephants killed 1,579 humans in three years — 585 in 2019-20, 461 in 2020-21, and 533 in 2021-22. Odisha accounted for the highest number of these deaths at 322, followed by Jharkhand at 291 (including 133 in 2021-22 alone), West Bengal at 240, Assam at 229, Chhattisgarh at 183, and Tamil Nadu at 152.

In 2011, it was found that the HEC as the main threat to Asian elephants and crop raiding was described as the primary reason for HEC. Therefore, many workers identified Asian elephant as a serious agricultural pest.

Elephants	2018-19	19-20	20-21
Humans killed by elephants	—	585	461
Elephants killed by trains...	19	14	12
... by electrocution	81	76	65
... by poaching	6	9	14
... by poisoning	9	0	2

533 Humans killed by elephants in 2021-22

- The crop raiding mainly occurs in case of rice and sugarcane, which is generally liked by the elephants in this region, starts right from initial growth to its final harvesting. However, the intensity and frequency of crop raiding attains peak level as the crops comes under maturation stage. The HEC was found to be higher during the riping of paddy. However, the incidence of crop raiding was not uniformly distributed, as few villages suffering significantly more damage (especially forest fringes) than the others which revealed the distance from corridors or elephant habitat increases the conflict gradually decreases.
- Household and property damage by wild elephants is major aspect of HEC after crop raiding. The main cause behind majority of the house damage cases was for stored paddy and other feeding materials. Likewise, house damage and human injury are due to the habitation in forest fringe areas and availability of palatable tree species nearby their homestead, farm lands etc. which attracts the elephant as a result of which severe incidences takes place. Damage to households and property occurred more or less throughout the year with a peak in cropping season especially in rainy and winter season.
- Human injury and death due to HEC is one of the very crucial aspects of such conflicts. Although the number of human injury and death incidence by elephants in northern corridors is comparatively less.
- Degradation of forest areas due to increasing human pressure tend towards HEC. When the interactions between elephants and human beings become very close certainly there would be a conflict between man and elephant. Elephants cause crop damage and attacks people which lead to severe injuries and ultimately to death. Besides this elephants also damaged



to human properties. Degradation of forest areas due to increasing human pressure tend towards HEC. When the interactions between elephants and human beings become very close certainly there would be a conflict between man and elephant. Elephants cause crop damage and attacks people which lead to severe injuries and ultimately to death. Besides this elephants also damage to human properties. Degradation of forest areas due to increasing human pressure tend towards HEC. When the interactions between elephants and human beings become very close certainly there would be a conflict between man and elephant. Elephants cause crop damage and attacks people which lead to severe injuries and ultimately to death. Besides this elephants also damage to human properties.

- Mitigation strategies for HEC include:
- Farmers sometimes use light and noise to scare elephants away, but these tactics can become less effective as the animals grow accustomed to them.
- Community groups can be trained to guide elephants back towards the forest and away from crops.
- Erection of fences or other barriers: Creating distinct wildlife corridors, building trenches, and erecting beehive fences around farms to deter elephants have all demonstrated the ability to be successful and cost-effective strategies for mitigating human-wildlife conflict.
- Improving community education and perception of animals: In a country where elephants are seen as a sacred animal – the incarnation of the god Ganesh – by the majority Hindu population, tolerance for elephants encroaching on farmland is generally high. There is a deep religious, cultural affinity for this animal due to which, hopefully, people will do more for elephants.
- Effective land use planning: Altering land use practices can help mitigate conflict between humans and crop-raiding animals. For example, in Mozambique, communities started to grow more chili pepper plants

after making the discovery that elephants dislike and avoid plants containing capsaicin. Other plants that can be planted for the same effect include lemon and ginger. This creative and effective method discourages elephants from trampling community farmers' fields as well as protects the species.

Compensation: The Indian government offers compensation for families who have suffered losses from wild animals but receiving a payment can be a long and bureaucratic process.

Spatial analyses and mapping conflict hotspots: Mapping interactions and creating spatial models has been successful in mitigating human-carnivore conflict and human-elephant conflict, among others. In Kenya, for example, using grid-based geographical information systems in collaboration with simple statistical analyses allowed conservationists to establish an effective predictor for human-elephant conflict.

Use of technology: Rapid technology development (especially Information Technology) can play a vital role in the prevention of Human-wildlife conflict. Drones and mobile applications can be used to detect the movements of animals and warn highways and railways authorities to prevent collisions of animals with vehicles and trains. SMS or WhatsApp messaging systems have also been used to alert people about the presence of animals in nearby areas. Early warning wireless systems have been successfully used in undulating and flat terrain to mitigate human-elephant conflict in Tamil Nadu, India.

In the long-term, one of the most effective ways to reduce the conflict will be to restore and protect forest areas and the ancient migration "corridors" elephants travel through. These strips of forest link elephants' natural habitats, and preserving them means the animals have less reason to stray onto farmland. The Wildlife Trust of India, along with the Ministry of Environment, Forest and Climate Change, and other partners, has identified 101 such corridors(as of 2021) and is working with state and national government to protect and secure them. Designing infrastructure like roads with underpasses for wildlife can also help keep connectivity for these corridors.

Human – Elephant Synchrony in Nature

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" If elephants didn't exist, you couldn't invent one. They belong to a small group of living things so unlikely they challenge credulity and common sense. "

- Lyall Watson

Lyall Watson, a South African botanist, zoologist, biologist, anthropologist, and ethnologist. Watson authored many books, including his famous best-seller "Supernature".

Elephants are the most empathic, highly sensitive and caring animals, much like humans. They are highly intelligent animals with complex emotions, feelings, compassion and self-awareness. They are a significant figure as closely associated with the myths, history and cultural heritage of India for centuries.

In Mythology, Lord Ganesh has the head of an elephant which symbolises wisdom, to dream without limitations; while the large ears express the fact to be a good listener which promotes deep connections. They had a magnificent role in Indian history. Elephants were found on the seal in the times of Indus Valley civilization .They was used in wars, military purpose and trampling chariots, transportation of heavy goods. They were used during the dynasties of the Mauryas and elephants were used by King Porus in the battle against Alexander the Great. Elephants were also used by Mughal Emperor to strengthen their army.

"Ran Bagha crossing the River Jumna" (detail), Basawan and Chetar, illustration from the Akbarnama, c. 1586-89, Mughal Empire, (Victoria and Albert Museum, London)

In recent times elephants are used for patrolling in the forest to protect other species from poaching as well as elephant safar and rides became popular tourist attraction.

Asian elephants, Elephas maximus and African elephants, Loxodonta africana are well distinguished by their physical appearance; by their head shape, tusk and ear. The population of Asian elephants are widely distributed along the Indian subcontinent :
India, Nepal, Bhutan, Bangladesh, Continental Southeast Asia (China, Myanmar, Thailand, Kampuchea, Laos, Vietnam, Malaysia) and Asian islands (Andaman Islands, Sri Lanka, Sumatra, Borneo). They have a wide range of habitat from dry to wet forest as well as grassland. Their diet is mainly grasses, roots, leaves, fibrous plants and bamboo. They also feed on crops such as banana, sugarcane and other fruits and vegetables. To keep themselves hydrated they intake large amount of water.

They raze the local farmers' plantation to consume sugarcane and banana, which is a major cause of human-elephant conflict in many regions. Every year many cases of such are found all over India. In July 2022, a heard of four elephants destroyed 10 acres of tomatoes and cabbage crops in Tamil Nadu. Similar incident took place in month of April and November in Kerala. These circumstances occurred in Madhya Pradesh, Uttar Pradesh, and Karnataka and West Bengal in the present year. The loss of natural habitat brings the elephants near human habitation, sparking the conflict. Both elephant and human are killed due to this conflict.

Increase of human population leading expansion of human settlement as well as developmental projects under taken causing destruction of habitat of wildlife, obstruction in their migratory routes, pollution which leads to disturbance in the climate, harming the wildlife.
Various management strategies are developed and then implemented by the State Forest departments for preventing and mitigating human-elephant conflict.

In 2010, Elephant was declared as the National Heritage Animal of India by the government with the aim of protecting this species. Asian elephant are listed as endangered by The IUCN Red List of Threatened Species in 2019. They are also placed under Schedule I and Part I of the Indian Wildlife Protection Act (1972) and in the Convention on International Trade in Endangered Species of Flora and Fauna (CITES), which confers to the highest level of protection. Project Elephant launched in the year 1992 to ensure the protection of elephant corridors and elephant habitat for the survival of the elephant population in the wild.

According to the recent elephant census done in 2017 by Project Elephant, India holds the population of (Asian Elephant) of about 29,964 elephants which is 60 percent of species global population. Karnataka stands first followed by Assam and Kerala. There are 33 elephant reserves in India covering approximately 80,777sq. km area. [As on November 2022].Corridors is the narrow natural habitat connecting two habitats of elephants without human interferes. 88 elephant corridor have been identified by the Wildlife Trust of India under the National elephant Corridor project in 2010 which have increased to 150. Among all West Bengal has the highest number of elephant corridor; 26 accounting 17 percent of total corridors.

Some practices undertaken by government to retain elephants in their natural habitat such as development and maintenance of perennial water holes to improve the water availability, plantation of fodder grass to keep elephant herds confined in the forest, invasive species need to be removed from wildlife habitat as well as proper monitoring and restoration should be done to prevent re invasion [it is practised in Tamil Nadu and Karnataka].

The Indian elephant is a keystone species as they are known as ecosystem engineer. They use their tusk, feet and trunk to dig holes to find water from underground. They have pivotal role in dispersion of seeds. In forest they clear the environment by stomping the vegetation, this allows light to enter the forest floor allowing the ground lying plants to grow. To spread awareness for the conservation and protection, World Elephant Day is celebration globally on 12th August. The day was launched in 2012 to bring attention to the urgent plight of Asian and African elephants.

The Causes:

The threat of survival due to loss of habitat and fragmentation. The competition for space instigates the conflict. Human activities like slash and burn shifting cultivation, logging, mining, plantation of coffee, tea, rubber possess threat to elephants. Human communities are developing and consuming wider space which is decreasing the space of this mega herbivorous animal. There has been gradual decrease in the forestry area, losing 668,400 hectares of forest cover in the last 30 years, a report by UK-based Utility Bidder said. India ranking second globally in rate of deforestation. These not only reducing the space for their home but also reduces the source of food.

Graceful even in death, this young elephant fell into a deep, open well one night in Palakkad, Kerala. The photographer suspects the elephant emerged from the nearby forest to feast on fruiting jackfruit trees in village. Open wells are a serious but little recognised threat to wild animals, including Gujarat's famed Asiatic lions, a few of which fall to their deaths every year. Image: Aneesh Sankarankutty

Poaching is not a direct cause of conflict between human and elephant but it causes threat to the elephant population. Species are killed for international trading of their body parts. In the past three years, 90 cases of seizure of elephant tusks/ivory have been reported in India along with 29 cases of poaching of elephants. The data were shared by the Ministry of Environment, Forest and Climate Change (MOEFCC) in the Lok Sabha on August 8, 2022.

What is Poaching?

Poaching is the word given for the illegal trafficking and killing of wildlife animals by poachers who illegally sell animals for high amounts of money. In order to maintain the earth's biodiversity, it is crucial for us to conserve the animals which are an essential part of our ecosystem.

Poaching of the tusks

Ashmita Paul, Sem 3 Hons

Poaching is a major cause of decline for both endangered Savanna elephants and critically endangered forest elephants, whose combined numbers have fallen to about 415,000, according to the International Union for Conservation of Nature.

Why are the elephants killed?

Ivory, which comes from elephant tusks, is considered very valuable. It is because of the high price of ivory, that poachers illegally kill elephants so that they can take their tusks and sell them. Tens of thousands of elephants are killed each year for their tusks, and as a result, elephant populations have declined rapidly.

The highest demand for ivory is in China, where tusks are carved into sculptures or used for other products. Both male and female African elephants have tusks, while only male Asian elephants, and only a certain percentage of males today, have tusks.

Unlike the ivory trade, the skin trade makes all elephants valuable to the poachers.

How are the tusks poached?

Poachers generally use Kalashnikovs or poisoned arrows to hurt the animal but don't kill it immediately. This leads to a painful death of the elephants.

How to protect them?

To prevent poaching cases, the tusks are being dyed with the same pink dye used on bank notes which makes the ivor unsellable and can't be consumed. Thus, it is saving the lives of the innocent elephants.

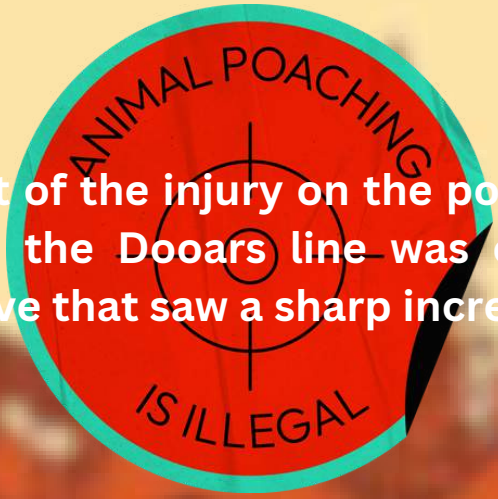
Case Study -I

In the past three years, 90 cases of seizure of elephant tusks/ivory have been reported in India along with 29 cases of poaching of elephants. The data were shared by the Ministry of Environment, Forest and Climate Change (MOEFCC) in the Lok Sabha on August 8. The highest number of cases of elephant tusk seizure was reported in 2021 with 42 cases, and incidents of poaching were the highest in the year 2021 with 14 incidents having been reported throughout the country. Meghalaya alone accounted for seven of the 14 poaching deaths. In the year 2018-19, six elephant deaths due to poaching were reported and nine poaching deaths were reported in 2019-20. Odisha, which has emerged as one of the hot spots of human-elephant conflict, has accounted for seven elephant deaths due to poaching in the past three years, while Meghalaya accounted for 12 poaching deaths in the past three years. Tamil Nadu has accounted for three deaths of elephants due to poaching. The data were tabled by Minister of State for Environment, Forest and Climate Change Ashwini Kumar Choubey in response to a question by five MPs.

Case Study -II

The Banarhat-Nagrakata train route passes through a major Elephant corridor often leading to such tragic accidents involving Elephants

The heart-wrenching video that surfaced on various social media platforms showed the critically injured Elephant trying hard to drag itself out of the railway track, as people watched in helplessness, after being hit by the engine of the intercity express.



The video shows the impact of the injury on the poor animal while people watch helplessly. In 2004, the Dooars line was converted from metre gauge to broad gauge; a move that saw a sharp increase in Elephant deaths in train-related accidents.

But despite all the precautionary measures and efforts, such as speed limits and buzzers, trains on the Dooars route have continued to kill Elephants. In the period between 2013 to June 2019, a total of 67 Elephants were killed in train-related accidents.

WHAT CAN WE DO TO HELP?

Protect All Wildlife supports Voice for Asian Elephants Society with their campaign to help stop Elephants from being crushed by speeding trains. They are piloting an early warning system to alert train drivers of Elephants' presence, with enough time for the speeding train to stop and the sirens will also warn Elephants.

Chief Wildlife Warden Ravikant Sinha had earlier said that the forest department is working to raise awareness among people to prevent man-elephant conflict and ensure that the habitat of animals is not encroached by people which forces them to stray into localities in search of food.

Message

Behind every piece of ivory—a full tusk or carved trinket—is a dead elephant. How can we sit back and accept the cruelty towards nature? We must protect the animals for they have every right to live just like we do. Let us together create a safe place for them and let not greed cause anymore damage to them!

Rhino Poaching

Shreya Roy, Sem 3 Hons

Hundreds of thousands of rhinoceros populated Africa and Asia at the beginning of the twentieth century even after centuries of demand for rhino horn from the Middle East, India, China, and eventually the West. Kaziranga National Park (NP) in Assam, India holds about 71% of the world's wild population of the greater one-horned rhino.

Why is the rhino horn so much valuable?

Rhino horn is made up of keratin - the same protein which forms the basis of our hair and nails.It is chemically complex and contains large quantities of sulphur-containing amino acids, particularly cysteine, as well as tyrosine, histidine, lysine, and arginine, and the salts calcium carbonate and calcium phosphate.

Ground rhino horn is used in traditional Asian medicine to 'cure' a range of ailments, from cancer to hangovers. And the horn is seen as a status symbol, particularly in Vietnam.

How is the horn poached?

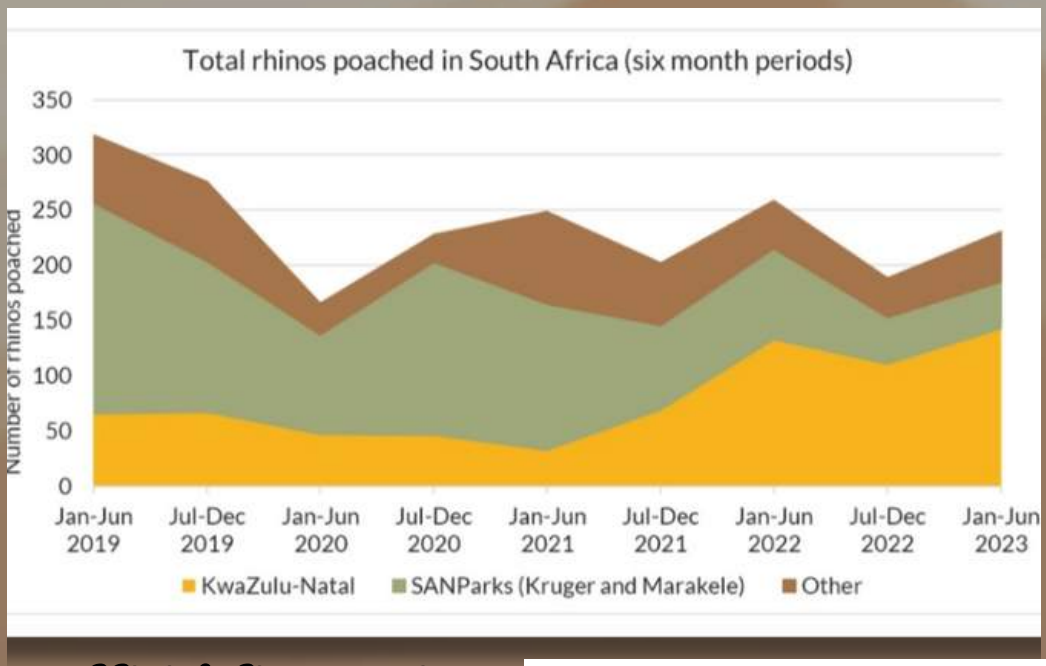
Poachers are supplied by international criminal gang who are connected with black market. Frequently a tranquiliser gun is used to bring the rhino down, before its horn is hacked off, leaving the rhino to wake up and bleed to death very painfully and slowly.

How much does rhino horn cost?

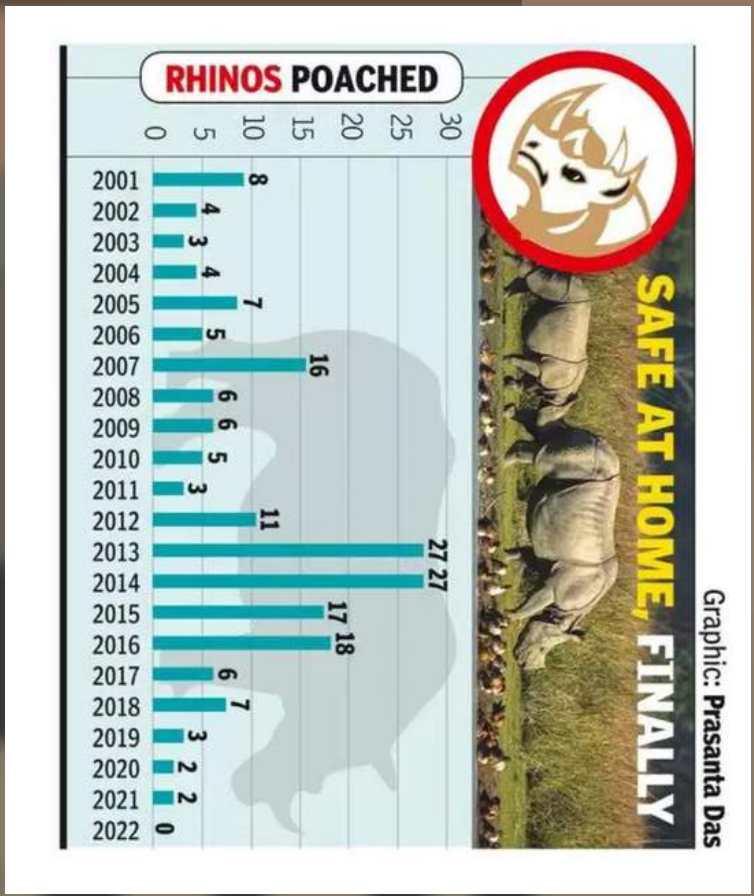
International trade in rhino horns has been banned since 1977, but it continues to fetch huge profits on the black market. At its peak, rhino horn was selling for up to $65,000 per kg, more than gold or cocaine.In the black market, rhino horn prices can fetch up to $400,000 per kg for Asian rhino horns and $20,000 per kg for African rhino horns.

Case Study

According to figures released on 1 August this year, 231 rhinos were poached in South Africa between January and June 2023. When compared to the same period in 2022, the total number of rhinos poached across the country shows a welcome decline.



According to official figures, in 2013 and 2014, Assam registered highest number of poaching with 27 cases each year. It got reduced to 17 cases in 2015 and the following year it was 18.The cases dropped to 6 in 2017 and it was 7 in 2018. From 2019, the cases dropped continuously with 3 cases in 2019, 2 cases in 2020 and 1 in 2021. For the first time in 45 years, since 1977, there has been no incident of rhino poaching in Assam in the year 2022



Jaldapara National Park in north Bengal has recorded more than 20% rise in its rhino population in three years. In 2019 the number of rhino was 237. But in 2022 the national park has been the home to about 292 rhinos.

Message

If a rhino could speak he'd beg the world to stop poaching. World Rhino Day on 22 September celebrates the world's five species of rhinoceros. It is an opportunity to fight against these poaching! We have to protect the rhinos. Protecting rhinos helps protect other animals as well as the species of plants in their ecosystem.

Pangolins Poaching

Rima Mondal, pursuing M.Sc in Zoology,
Graduated from Victoria Institution(College), 2023.

Introduction

Pangolins are among the most trafficked wild mammals globally. India is home to two species: the Indian Pangolin, found across the subcontinent; and the Chinese Pangolin, found across a larger area in south Asia. Bihar, West Bengal, and Assam see the presence of both.

Globally, there are only eight species of pangolins, which occur exclusively in Africa (four species) and Asia (four species). They have been exploited locally mainly for food and traditional medicine throughout history.

The main demand for pangolins in Asia comes from China and Vietnam, where their scales are used for traditional medicine and their meat is consumed as a sign of wealth and status

Currently, however, the main threat to pangolins, in both Asia and Africa, is large-scale poaching for illegal international commercial trade.

The Indian Pangolin has been classified as 'Endangered' and the Chinese Pangolin as 'Critically Endangered' by the International Union for Conservation of Nature's Red List of Threatened Species.

Pangolins Play an Important Role In The Ecosystem–

Pest Control

Pangolins eat an enormous number of insects. Indeed, an adult pangolin is capable of consuming over 70 million insects per year. Their diet is mostly made up of ants and termites, so you can imagine how beneficial pangolins are to both people and other animals when it comes to pest control. Just one pangolin can eat enough termites to protect over 40 acres of land from destruction! Unfortunately, local populations aren't always aware that pangolins play such an important role in keeping ants and termites away from homes and crops.

The burrows pangolins dig are also beneficial for the ecosystem. As they dig, pangolins aerate the soil and help turn over organic material. Plus, their burrows provide a habitat for other organisms. Some pangolin burrows have even been discovered that are so large a persn could stand in them!

Case Study about Pangolin:

A. On the eve of World Pangolin Day observed on February 18, a not-for-profit organisation working on the international trade of animals and plants, has brought out a fact sheet reporting that 1,203 pangolins have been found in illegal wildlife trade in India from 2018 to 2022.

B. Pangolins are relentlessly hunted in India for commercial trade . Between 2009 and 2014, there were 49 pangolin seizures reported in India which accounted for 913 kg of scales and two whole pangolins .

C. India was also identified as an important origin country for pangolins found in illegal international trade from 2010 to 2015 .

D. Between 2015 and 2017, there were 41 pangolins seizures, the majority of which were of scales amounting to 4852 kg.

E. However pangolins poaching increase during the COVID-19 lockdown from March 2020, in comparison to the same period in 2018 and 2019, pre-pandemic.

F. Odisha reported the maximum number of incidents, with 154 pangolins in 74 seizures.

G. It was followed by Maharashtra with 135 pangolins in 47 seizure incidents. The publication, titled 'India's Pangolins Buried in Illegal Wildlife Trade', has tracked 342 total incidents during this time period. Eight incidents of online trading were also recorded.

Upto 24 States and one Union Territory saw seizures of pangolins and their derivates.

Way to stop Pangolin poaching and conservation

1. IMPROVING THE BIOLOGICAL KNOWLEDGE BASE :

Pangolins are secretive, solitary, and mostly nocturnal—and many mysteries remain about their natural history and behavior. We do not even have a solid estimate of how many pangolins remain in the wild. Conservationists and scientists are working to map the current distribution and range, and estimate population sizes.

2. TRAINING RANGERS AND WILDLIFE AUTHORITIES

Enforcement efforts must be ramped up to deliver a real deterrent to the illegal pangolin trade. This means increasing the skills and knowledge of rangers and wildlife authorities in the areas where pangolins are being hunted by providing them with tools and resources to crack down on poaching and trafficking.

3. EDUCATION INITIATIVES :

One major obstacle for pangolins is that most people do not know that they even exist. Public audiences around the world need to be educated about pangolins and their crisis in order to inspire action.
Communities and local officials need to be fully aware of the benefits of pangolin conservation so that they can become involved in conservation action.

4. RESCUE AND REHABILITATION CENTERS :

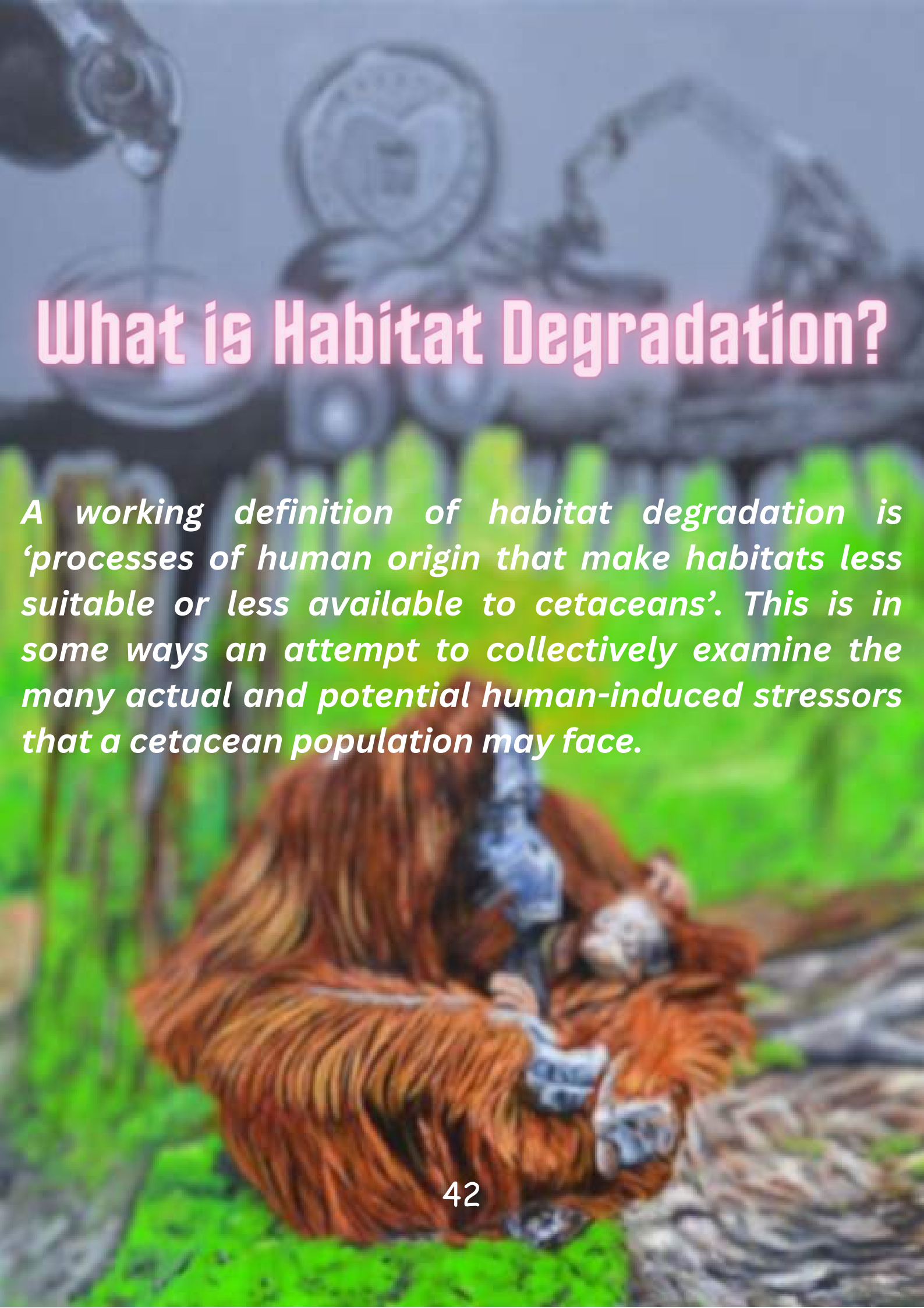
Pangolins are extremely difficult to maintain in captivity, and most die within a short period after capture. Most pangolin range states lack the capacity and infrastructure to care for injured pangolins that are seized from the illegal wildlife trade. Conservation efforts must emphasize stopping the removal of pangolins from the wild.
so it's key to develop ways pangolins can be treated and rehabilitated in captivity so that they can be returned to their native habitats.

Message

The world's most trafficked mammal may vanish before many people have ever heard of it. The pangolin, a shy and scaly animal, resembles an armadillo and is found in both Africa and Asia. All eight species, four found on each continent, are decreasing in population and are at risk of extinction.Pangolins have seen a rapid decline in their population in the last several decades. In areas of accelerated human population growth, habitat loss is a grave threat for pangolins. Poaching also is a dire threat: Pangolins are slow-moving and will roll themselves into a ball if they feel threatened — making them easy targets. Their armor-plated scales can cut and inflict serious wounds on a lion, leopard, or hyena — but are no match for a weapon-wielding human.
Pangolins play very important role to maintain our ecosystem , specially for pest control. If the pangolin poaching is continues at this rate then in near future pangolin are totally extinct from nature , So we should prevent pangolin poaching and conserve this animal at his native habitats.

What is Habitat Degradation?

A working definition of habitat degradation is 'processes of human origin that make habitats less suitable or less available to cetaceans'. This is in some ways an attempt to collectively examine the many actual and potential human-induced stressors that a cetacean population may face.



Habitat Degradation

Riya Mondal & Shreya Sadhukhan

Sem 3 , Zoology Hons

"Yet, this is what happens every day to wildlife and underwater species as their habitats are destroyed!"

Since the beginning of the Common Era two thousand years ago, the human population has grown exponentially. At the time of Christ's birth, approximately 200 million people roamed the planet (Southwick 159). That number now stands at about 7.4 billion people and continues to rise (World Population Data Sheet).
A 2015 World Population Prospects report estimates "an 80% probability that the population of the world will be between 8.4 and 8.6 billion in 2030, between 9.4 and 10 billion in 2050, and between 10 and 12.5 billion in 2100" (Jones and Anderson).

Now the question is -
What are potential issues with a large, perhaps excessively large, global population?
Overpopulation is one of the most pressing problems faced by our society. Around the world, cities are becoming overcrowded, leading to the emergence of dirty slums that lack access to clean water, sanitation, and other basic human needs. Arable land is being replaced by sprawling, suburban developments.
Suburban sprawl also contributes heavily to habitat loss and mass extinction.
By definition, habitat loss is also known as habitat destruction, and it occurs when we destroy the natural shelters that are home to wildlife.

How take a look at what is habitat !?
Wikipedia says, "A habitat is an ecological or environmental area that is inhabited by a particular species of animal, plant, or other type of organism. The term typically refers to the zone in which the organism lives and where it can find food, shelter, protection, and mates for reproduction. It is the natural environment in which an organism lives or the physical environment that surrounds a species population."

Cause of natural habitats Degradation

knowing that the death of wildlife and negative environmental impact result from habitat degradation it's reasonable to question why we continue to carry on habits that destroy biodiversity.

1. Agricultural mobility

Unlike in the past, when small areas of land were used to grow crops for families and local communities, farming is now a big business that can be run by large corporations.

Nowadays, agriculture involves the mass production of foods that can quickly be sold for gain. Extra land is needed to grow more edible goods, and more land has to be cleared to meet these needs.

2. Constant Need for New settlement Areas

Most natural habitats are often destroyed to make way for human residences. Land is cleared to accommodate large buildings and to create space for more lucrative fascination But then, natural habitats are not always ruined to use the land for humans to live. They are also destroyed so that their materials can be used to keep humans comfortable.

For example, trees are used to create various paper products, and wood is used to produce furniture and various items.

3. Need to Make Room for More Businesses and To Meet the Demand of Large Corporations

Stores, homes, and commercial places clearly cover a massive amount of land. But did you know that many of these places now stand where only wildlife and natural habitats once existed?

Well, that is right, and the constantly growing demand for these spaces continues to necessitate more degradation of natural habitats.

Impact of habitats loss and degradation

As we make more room for people, we often overlook the homes that are being destroyed in the process.

1. Extinction of Some Species

Habitat degradation is the leading cause of extinction for various species and is the reason many animals are endangered. Animals are very intelligent beings, but without their natural homes, they cannot protect themselves and care for their young.

2. Growing Stress on Wildlife

When preparing land for homes and buildings, it's necessary to confirm a level surface for stability and the construction process. Bulldozers are often used to clear trees and flatten the ground in woodlands to earn this. Unfortunately, these changes occur so abruptly for animals that they have no time to adapt to such drastic alterations to their habitats.

3. Disclose Wildlife to Unpleasant Conditions

Animals store food and water to sustain themselves during challenging periods or when their usual food supply is unavailable due to seasonal changes. In adverse weather conditions, natural shelters serve a role akin to human homes, offering protection from storms, heavy hbe rain, and extreme temperatures.

The displacement of wildlife disrupts their entire way of life. Many species rely on their habitats as sanctuaries from predators. Additionally, young animals in the wild require diverse forms of care; they must be protected from predators during their vulnerable stages and learn the skills needed for hunting and gathering food.

4. Throws Off the Ecosystem Balance

Ecosystems are nature's way of creating a balance between different species and the environment. Life in the wild is instinctual, with everything being interconnected.

Everything from blades of grass to the tallest trees serves a purpose. Animals thrive off of the land and also from one another.

When we disturb this balance, they are often left confused and lost, finding themselves in harm's way. The final result is death and the inability to reproduce offspring that carry on the species.

5. Poor Soil Quality

We must also consider what happens to the ground when examining the effects of habitat loss. Many plants can no longer grow because the composition and soil quality are instantly changed, taking away the nutrients and space plants need to grow.

The land itself is also packed down so tightly from human materials that many plants cannot force themselves to grow, and if the seeds are not sown elsewhere, the plant type could be completely lost within the region.

6. Infiltration of Underwater Systems by Chemicals

With large amounts of land used for industrial farming, runoff is becoming a common cause of pollution and habitat degradation. You see, farming often requires large amounts of fertilizers, pesticides, and other materials that are full of chemicals and harmful ingredients.

Theses substances are used to protect crops and develop their improvement. Ultimately, the toxic ingredients are absorbed into the ground and flow into lakes, rivers, and oceans, poisoning the water and animals.

7. It Exarcebates Global Warming and Climate Change

The more trees that are cut down, the more carbon dioxide goes into the air, and that causes the Earth to heat up more quickly.

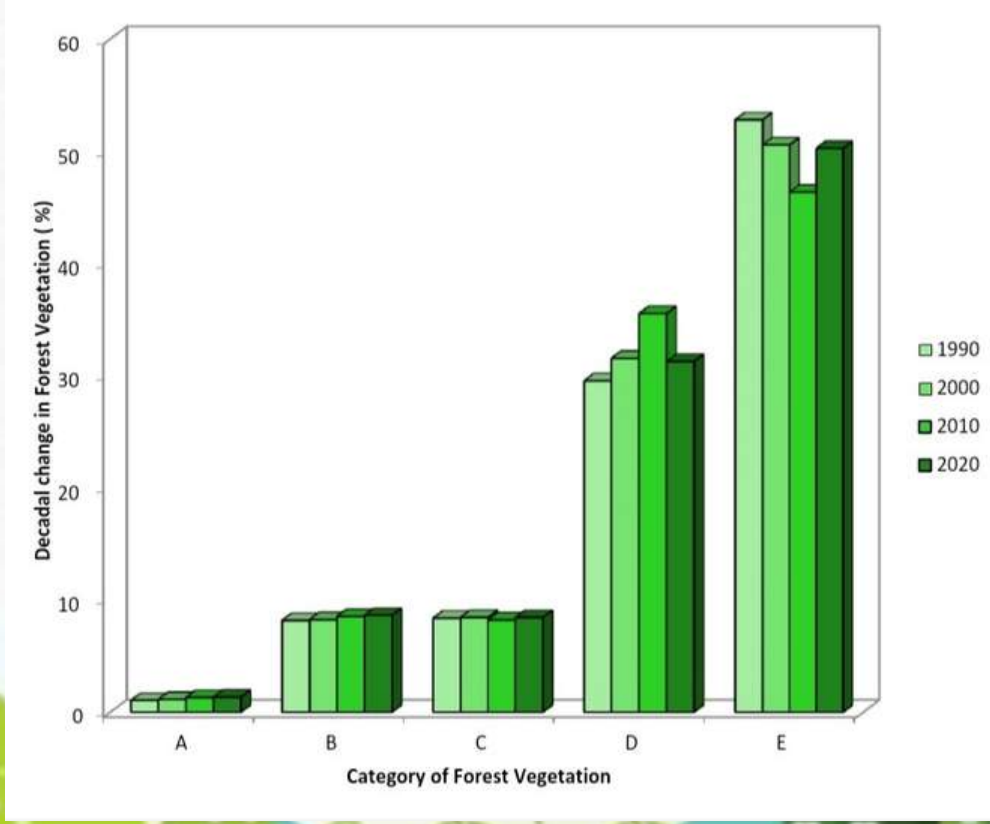
This temperature change is killing various species, especially in regions where the changes are extreme. Therefore, temperatures become more unpleasant as time passes, and additional greenhouse gases fill the air.

Case study

The spatial information in the temporal context is an important tool to assess the sensible areas of fragmented forest cover and habitat loss. In this study, Satellite data of last 30 years of time span used to generate Normalised Difference Vegetation Index (NDVI) which is a key indicator to assess the status of vegetation cover. This paper deals with the causes of habitat fragmentation and its adverse effect on Mahananda Wildlife Sanctuary (MWLS). Result is showing regressing rate of forest cover loss in present years as compare to past years along with creating more patches in the ecosystem. Some species needs more space for movement than others as a result of which they will migrate or die leaving the habitat intact with less diversity. Considering this fact the lower reaches of MWLS is in great danger.

Landsat image dataset

Assessment year	Satellite	Path / Row	Spatial resolution (Mtr.)	Acquisition date
1990	Landsat 5	139/41	30	05-11-1990
2000	Landsat 5	139/41	30	15-10-2000
2010	Landsat 5	139/41	30	14-12-2010
2020	Landsat 8	139/41	30	02-09-2020



Decadal change in forest cover over thirty years

The Government has taken several steps to protect wildlife and its habitats. Important steps taken in this regard include:

- The Wild Life (Protection) Act, 1972 provides for stringent punishment for violation of its provisions. The Act also provides for forfeiture of any equipment, vehicle or weapon that is used for committing wildlife offence(s). Rare and endangered species found in India, like Tiger, Snow Leopard, Great Indian Bustard, Gangetic Dolphin, Dugong, etc. have been listed in Schedule-I of the Wild Life (Protection) Act, 1972 thereby providing them highest degree of protection.
- Protected Areas, viz., National Parks, Sanctuaries, Conservation Reserves and Community Reserves have been created in the country covering important habitats to provide better protection to wildlife, including threatened species and their habitat.
- Financial assistance is provided to the State/Union Territory Governments under the Centrally Sponsored Scheme of 'Integrated Development of Wildlife Habitats', for better protection to wildlife and improvement of habitat.
- The local communities are involved in conservation measures through eco-development activities which help the forest departments in protection of wildlife.
- The Wild Life Crime Control Bureau (WCCB) coordinates with State/UTs and other enforcement agencies to gather intelligence about poaching and unlawful trade in wild animals and animal articles.
- Alerts and advisories were issued by WCCB on poaching and illegal trade of wildlife to the concerned State and Central agencies for preventive action.

In many countries around the world, overpopulation fuels habitat loss and places many plant and animal species in peril. As the author of the Audubon publication, Population and Habitat: Making the Connection, suggests, "The destruction of the natural world we see across the globe today is "fallout" from the human population explosion that has occurred over the course of the last 50 years" (Effects of Overpopulation).

To avoid a continuation of the "sixth mass extinction," humans must stop clear-cutting forests and attempt to promote vertical development rather than sprawl. If we, as a species, don't change our behavior, other species will continue to die off, biodiversity will be threatened, and ecosystems will be threatened.

Prevention of Habitat Degradation

1. Reforestation
2. Recycle waste at home.
3. Create compost from organic waste.
4. Cut out the use of single-use plastic
5. Switch to eco-friendly appliances.
6. Decrease your energy consumption
7. Control invasive species.

Some measures to avoid the adversity

- - Be the voice for the voiceless.
- - Say 'No' to Animal Abuse.
- - Don't buy pets. Adopt one.
- - The one you hunt will be haunting you one day.
- - If you can't build a nest, don't destroy one.
- - Baby animals need their mothers too. So don't make them orphans.
- - Once you save an animal, it will always remember you.
- - Instead of pretending to be a lion at home, try saving one in real life.
- - Animals might not speak, but they always remember.
- - May the forest be with you.
- - Respect an animal, and it will respect you forever.
- - Say no to cruelty to animals.
- - Try to be a paw-rfect human being.
- - God gave life to all animals, and you've no right to take it.
- - Live and let them live too.
- - Treat animals the way you want to be treated.

What is Climate Change?

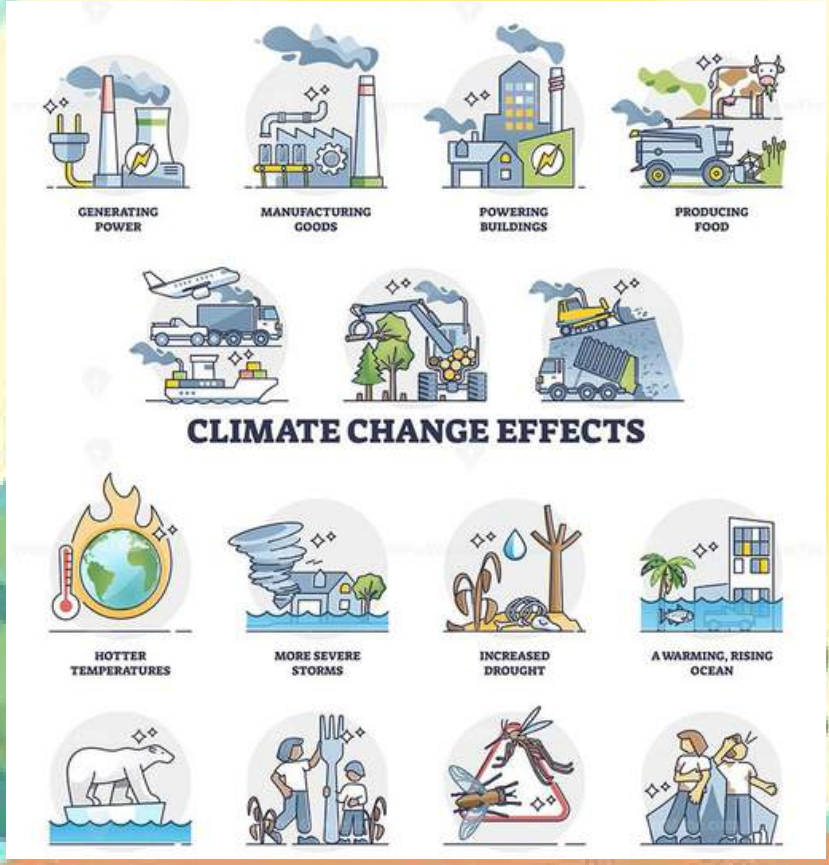
Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas), which produces heat-trapping gases.

CLIMATE CHANGE: AN OVERVIEW

BIDIPTA DEY, SEM 3 HONS

CLIMATE CHANGE REFERS TO LONG-TERM SHIFTS IN TEMPERATURE & WEATHER PATTERNS. SUCH SHIFTS CAN BE NATURAL, DUE TO DIFFERENT CAUSES LIKE –

- HOTTER TEMPERATURE
- MORE SEVERE STORMS
- INCREASED DROUGHT
- RISING OCEAN
- LOSS OF SPICES
- MORE HEALTH RISKS ETC.



EFFECTS ARE:

- GENERATING POWER
- MANUFACTURING GOODS
- CUTTING DOWN FOREST
- USING TRANSPORTATION
- PRODUCING FOOD
- POWERING BUILDING
- CONSUMING TOO MUCH ETC.

CLIMATE CHANGE INCREASE IN CONFLICT BETWEEN WILDLIFE & HUMAN OVER HABITAT & RESOURCES , THERE ARE MANY EXAMPLES -
IT SAID CLIMATE CHANGE THREATES THE SURVIVAL OF TIGERS IN THE SUNDARBANS AND IS ONE OF THE MAJOR CHALLENGES FACING THE WILDLIFE IN WESTERN GHATS.

SOME ANIMALS SUCH AS MOUNTAIN GOATS WILL INITIALLY RETREAT TO HIGHER COLDER AREAS BUT IF TEMPERATURE CONTINUE TO RAISE EVEN THE PIC MIGHT ONE DAY GROW TOO WARM THEN THE SPECIES WILL DIE OUT.

CLIMATE CHANGE CAUSES ICE TO MELT IN GREENLAND ACTUALLY LAST 152 CUBIC KILOMETRES OF ICE WHICH IS SO MUCH JUST BETWEEN 2000 TO 2006 AND THIS IS WHY THE POLAR BEARS HAVE BECOME A BIT OF POSTER ANIMAL CONSERVATIONISTS THEY USE ICE TO TRAVEL FROM AREA TO AREA WHEN THE SEA ICE TAKES LONGER TO REFORM OR JUST DISAPPEAR ENTIRELY IT MEANS THIS STRUGGLE TO GET BACK TO THEIR PREFERRED HUNTING GROUNDS AT CERTAIN TIMES.

Many animals migrate one to another place for grows of hotness that shows the imbalance in the food chain of ecosystem for the different migration the adapt new features if it's continue then after some year more species can be extinct.
Not only the animals the birds are also threaten for this climate change and there are also many example for this effect –

Globally birds are threatened for climate change the latest research by the University of Sheffield suggests that climate change may wipe out birds in extreme physical features in this case small and lodge birds are likely to be the most impacted.

Let us know how is this possible -

Birds are worm blooded creature just like humans as global temperature rises birds will try changing their physical attributes in an attempt maintain a relatively constant body temperature according to previous studies bills of parrots have become bigger but 10% in the last 150 years thanks to climate change.
There are also many negative impact like , the loss of specialist birds will also have a huge negative impact on nature for example vulture provide vital ecosystem services by removing decaying carcasses the loss of vultures in the Himalayan regions due to climate change could increase the direct transmission of infection disease.
Even for climate change house sparrows , pigeons are also threatened and year of the year we saw some changes in the migratory bird at santragachi jhill in West Bengal.

Some disease causes for climate change –

Like the other animals are birds their threatened or they lost their species for the climate change the another species will profit from rising temperature the mosquito that carries malaria will spread bringing the deadly disease to more & more countries.

Adaptation & loss of spices –

Climate change could eventually drive species to evolve giving rise to new adaptation what is clear is that changing habitats and food sources will have serious long term consequences for animals and for human being as well.

Till now we are just talk about what is climate change, it's effect on human & wildlife, causes...but if we don't know how to stop it then one day no one will be alive to read it , so now we should know that what can we do –

- Habitat transformation – Reduce deforestation, we are going to have to be more frugal, we are going to have to eat less meat buy less , eat more vegetables
- Reduce, reuse , repair & recycle
- Save energy at home etc.

EFFECTS OF CLIMATE CHANGE

Shreya Ray, Sem 3 Hons

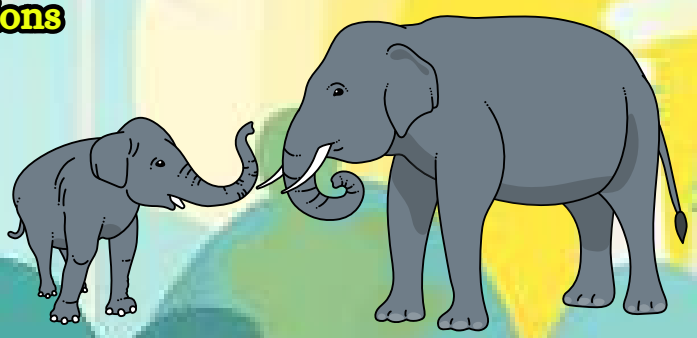
Climate change is reshaping environments around the world. Rising sea levels, extreme drought, disastrous floods, melting glaciers and even extinction of wildlife species are some of the crucial consequences of climate change ..Its impact on global flora and fauna populations is being documented, and has now come to be widely known. A new research conducted recently has shed light on yet another adverse effect of climate change: an increase in human-wildlife conflict.

Research is done on the premise where climate change has amplified resource scarcity, which has in turn altered human and animal behaviour, and their distributions. Natural habitats have been affected, disturbing the availability of food resources for wildlife. Food scarcity drives animals towards areas where there is an abundance of food. Climate change has modified agricultural practices and land use by people across the globe. This has resulted in a competition for food resources by man and animal, and higher chances for conflict.
Take the case of the Bharal (or blue sheep) and Snow leopards residing in the Himalayas, for instance. Long-term climate change has degraded and shrunk the alpine grasslands that form their habitat. As a result, the Bharal are forced to move to the regions at lower elevation that are closer to villages to forage on their crops, which creates a conflict for resources. Snow leopards have also followed their prey into human-populated areas, resulting in livestock predation and retaliatory killings by locals. This is how climate change has put the entire food web in jeopardy.

Climate change has altered the timing and duration of seasons, thereby influencing wildlife migration and breeding. Sudden encounters with wild animals are therefore on the rise, since it is becoming more difficult to predict the species' presence at a given time and location.

A significant example of this has been the rising number of snake sightings in Jammu and Kashmir. Summer here usually begins in May or June. This is when the resident snakes usually emerge from their hibernation period (known as brumation). However, the year 2022 marked the hottest March experienced by India in 122 years. This resulted in the snakes coming out earlier than expected, causing a lot of panic among natives.

Another case of this is the effect of severe drought that has on wildlife in India during heatwaves. Water scarcity affects a wide range of animals, from civets and jackals to tigers and elephants. Elephants, especially, require a lot of freshwater, a lack of which can certainly propel changes in their migration pattern. Thus, most conflicts arise when animals have to shift from one habitat to another due to extreme weather conditions



Addressing climate change is pivotal to conservation efforts. An urgent and close understanding of their correlation would help the survival of several species in the long run. In order to confront the issue of human-wildlife conflict, we need a comprehensive approach that considers the broader ecological, social, and climatic contexts in which these conflicts occur. Once these factors are taken into account, effective and sustainable solutions to benefit both human beings and wildlife can be attained. Identifying pathways would allow the development of conflict mitigation strategies and proactive policies to limit the impacts of climate change on biodiversity and human wellbeing.

In the meantime, we can minimise what adds to climate change by making small, yet significant changes in our everyday lives. Using eco-friendly modes of transportation, supporting local and sustainable businesses, purchasing produced products locally, and reducing, recycling and upcycling our waste are all daily decisions that we can take to live a more sustainable life.
The International Union for Conservation of Nature (IUCN)'s threat classification system identifies 'climate change and severe weather' among the 12 categories of threats to wildlife.

According to a landmark report by Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, the distribution of 47 percent of the proportion of land animals and 23 percent of threatened birds may already have been negatively impacted by climate change.

In India, the National Wildlife Action Plan (NWAP) 2017–31 acknowledges that the country's protected areas were designed at a time when climate change was not a criteria for wildlife conservation. The NWAP explains how wildlife species will need to disperse to more suitable habitats in response to climate change.

At present, India has less than 5 percent of land in the form of protected areas for wildlife. These protected areas are often surrounded by densely populated settlements, providing several opportunities for human–animal interactions and, invariably, conflict. According to research done by Centre for Wildlife Studies (CWS)–a non profit that works on wildlife research, conservation, policy, and education—India is a high-wildlife, high-conflict country, with an average of 80,000 incidents reported per year to the government. There are broadly five types of conflict: people losing crops, property damage, livestock being attacked, human injury, and human death. Approximately 70 percent of the conflict is crop and property damage. Livestock damage is approximately 15–20 percent; human injury or deaths comprise 5 percent, which is remarkably low given the high densities of people that come into close contact with large animals such as elephants, pigs, tigers, leopards, and bears.

The Issue of human–animal conflict isn't restricted to India alone. In fact, India has held on to its wildlife despite large-scale development, land-use change, and economic growth because there's tremendous cultural tolerance for animals.

Light Pollution : A Novel Threat to Nocturnal Animals

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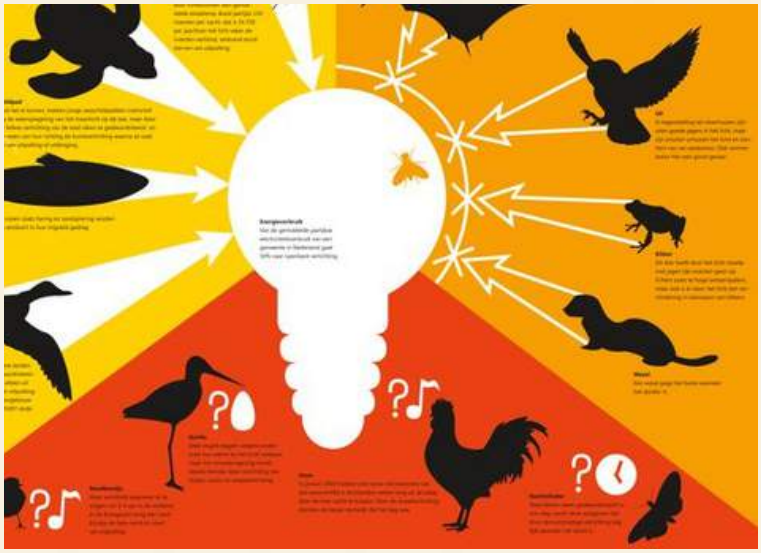
INTRODUCTION

Light is one of the essential form of electromagnetic radiations that our eyes can detect, Light plays the most crucial role in our daily lives. As the first light of dawn infuse our world, the radiant beam of the sun becomes the source of light, and as the dark night embraces the world we call upon several sources of artificial light. At the nightfall, LED lights, candles, high pressure sodium lights, divas etc. have become a necessary part of our daily life.

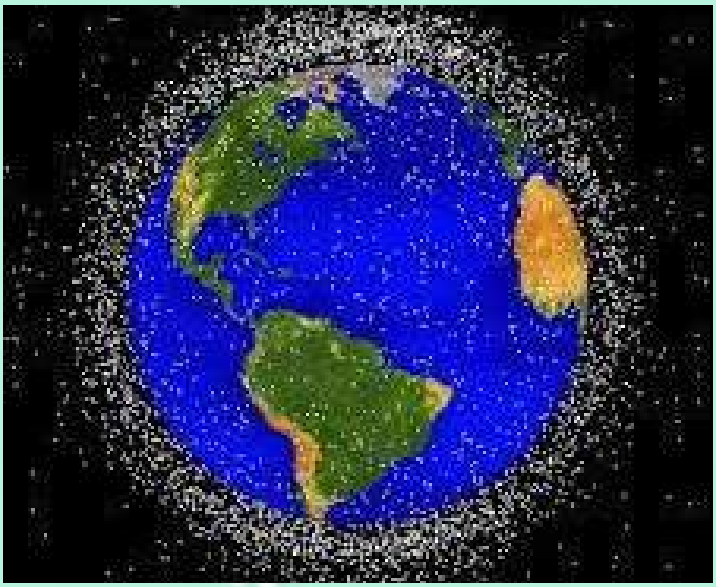


Light not only allows us to see or perceive things but also it has significant impacts on photosynthesis in plants, communications, growth of plants, several chemical reactions and many more. It has revolutionized field like entertainment, photography, scientific researches etc.

We all love light, we all need light. But there are always two sides of a coin while one side is beneficial, the other side may be evil. Just like that light is also proved to have both the good and bad side in it. We are already aware of how inevitable the discovery of artificial light at night (ALAN) is in human civilization, but we barely know that light can cause pollution too.

Light pollution is a type of environmental pollution caused by the excessive and artificial illumination of the night sky, resulting in the disruption of natural light cycles. Light pollution is a growing problem worldwide, as urban areas expand and artificial light sources become more prevalent. 57 many studies have investigated the effects of light pollution on human health and well-being, less attention has been paid to its impacts on nocturnal animals. This disruption of light cy has severe consequences for the natural environment, including the physiological and ecological impacts on nocturnal animals. This tends to disturb the physiological activities of nocturnal animals such as mating, foraging, roosting and predating behaviour. It also greatly hampers the light cycle of a wide variety of animal and birds. It has been a global threat for the insect populations as well. The pollinating insects have been facing this crisis for several years due to artificial light at night (ALAN). This consequently may cause ecological disaster to the wildlife.

Scientists have classified the light pollution into two categories- "astronomical light pollution" and "ecological light pollution". Astronomical light pollution is characterized mainly by sky glow and the lost ability to observe celestial objects due to bright night sky. The latter refers to where stars and other celestial bodies are washed out by light that is either directed or reflected upward. Ecological light pollution refers to artificial light that can disrupt interspecific interactions evolved in natural patterns of light and dark, with serious implications for community ecology (plants, animals and humans).



With over 8,000 satellites currently in operation, covering the entire planet, the issue of satellite proliferation is becoming a matter of concern too

2. Light Pollution and its effects

2.1. Invertebrates

Tropical coral reefs, one of the most biologically diverse and productive ecosystems on Earth, is now in the verge of worldwide destruction because of unrestricted anthropological activities, clim ate change. Ocean acidification as well as light pollution. Advanced studies show light pollution disrupts their reproductive cycle as their spawning synchronicity is controlled by lunar phases and moon light as their photo-reception varies depending upon the irradiance level of moon light. Artificial lights (ALAN) having different wavelengths and intensities than moon light often delays their spermary and oocyte development. Apart from this ALAN also gives rise to an oxidative stress condition in coral, lowers photosynthesis performance and changes chlorophyll and the algal density parameters. Different lights such as Blue LED and White LED spectrum showed more negative effects in comparison to Yellow LEDs on coral physiology.

Light pollution disrupting spawning of coral

Recent researches in UK found greater losses of moths at light polluted sites than dark ones. Vehicle headlights also eliminated at least 100 billion insects per summer in Germany as reported. The artificial light interferes with the insects' perception of light, thus leaving them in jeopardy and these night pollinators fail to find flowers that are yet to unfurl. Insects that keep away from light, for example, the giant wingless crickets of New Zealand, spend less time foraging in lit areas. During foraging in light polluted areas they often become lucrative target for predators like spiders, rats, geckos, bats, birds etc.

An experiment performed by Keren Levy's team demonstrated that ALAN affected crickets lost the rhythm in their movement and manifested a fee running pattern of locomotion. The magnitude of the dosruption in their movement varies with different light intensities. "Ecologically relevant ALAN intensities affect crickets' behavioural patterns, and may lead to decoupling of locomotion and stridulation behaviours at the individual level, and to loss of synchronization at the population level", they claimed.

In another study it has been proved that chronic exposure to light of different intensities for different time period severely hampers the growth, reproduction and decreases adult survival rate in Drosophila melanogaster. This result highlights the fact that ALAN has the capability to alter multiple life history traits at both individual and population level.

Artificial light can mess with crucial behaviors and biological cycles, like hunting or circadian rhythms, which rely on light exposure and its duration. There are some reports about some populations of the Big Dipper fireflies, one of the most common species of United States, dwindling or even disappearing in certain areas, noted Sara Lewis, professor emerita of biology at Tufts University and co-chair of the International Union for Conservation of Nature's Firefly Specialist Group. Light pollution is the second greatest threat to fireflies, just after habitat loss, she added.

Apart from all the terrestrial flying insects, aquatic insects that swim in the ponds or rivers are also declining due to light pollution.recent studies show that the aquatic insects and their larvae are experiencing the devastating effects of light pollution. Dr. Frans Hölker's team has revealed that in illuminated water insects were trapped in a significantly higher number, which clearly demonstrated the under-water vacuum cleaner effect of artificial light.

Also light from streetlights have been found to alter plant toughness and performance of herbivorous insects destructing plant - insect interaction in nature.

2.2. Vertebrates

Fires, artificial lights emitted from lighthouses, flashing and rotating lights of luxurious decorative lights, electric street lamps, televisions, FM radio towers, gas flares from offshore oil and gas platforms and oil refineries altogether pose a great threat to the migratory birds as they easily get attracted to these lights due to their different visionary system. They can mistake their landmarks by these misleading light sources. In the past decades mortality of migratory birds has significantly ameliorated as different surveys suggested. Studies conducted in late 1800s indicated that fixed white lights are more deadly than revolving coloured lights, whereas revolving or flashing white light is way more dangerous than fixed white light. A case study in 1989 by making the light beam of lighthouses narrower and dimmer at Long Point, Lake Erie, Ontario, Canada showed a dramatic reduction of bird mortality. Taller towers need more stabilizing and warning lights for aircraft, which are held responsible for the deaths of hundreds of thousands of birds during nocturnal migration. However recent studies indicate a decline in the number of tower fatalities over the last 20 years despite the increased heights. Vulnerability to artificial light seems to be greatest among those birds that feed on bioluminescent prey, including even some of the largest of marine birds such as king penguins. Though less as compared to migratory birds, marine birds also face similar pattern of threats by light pollution.

Big cities, bright lights and suffering migratory birds

Artificial lighting at night is another well documented catalyst of increased mortality among sea turtles. The night lighting disrupts the female sea turtles' nest searching behaviour and sea-finding behaviour of the offspring. Several measures were atempted to traditionally mitigate these adverse effects by using streetlight filters on electric lamps in a way such that the shorter violet to green wavelength of light could be avoided as the turtles are most sensitive to this range.a study by Nelson (2002) revealed that light emitted from filtered high-pressure sodium lamps are less attractive to the turtles. This study also proved that intensity is a major factor that attracts them towards light sources. Other reptiles along with the Anuran amphibians (frogs and toads) are suffering a global decline in population size and diversity.Artificial lighting also can alter the mate choice behavior as female Túngara frogs (Physalaemus pustulosus) were more likely to choose mates and be more discriminating of mates under darker conditions than under brighter conditions. The possible reason for this behavior could have been the greater perceived threat to predation being more visible to visually oriented predators.

3. How can we fight Light Pollution

With the increasing demand for light in our lives, is it really possible to erase this silent devil from this world? The answer is yes, because it is easier to combat light pollution than other types of pollution.

"Light pollution is relatively easy to solve, as once you turn off a light, it is gone. You don't have to go and clean up light like you do with most pollutants," said Brett Seymoure, the Grossman Family Postdoctoral Fellow of the Living Earth Collaborative at Washington University in St. Louis. So during night time we can use light as per our needs and turn it off when not necessary. By achieving a better lighting practices we can effectively reduce the hazards caused by ALAN. Four characteristics of light, such as intensity (or overall brightness); spectral composition (how colorful and what color it is); polarization; and flicker, are important causative factors of pollution.

Depending on the insect species, its sex, its behavior and the timing of its activity, all four of these light characteristics can be very important," Seymoure claimed.

We can do a survey on what type of insects and animals prevail in our surrounding followed by a precise study on the range of intensity and wavelength of light that would do less harm to them and use lights of suitable intensity and wavelengths.

Seymoure also stated, "The general rule is that blue and white light are the most attractive to insects. However, there are hundreds of species that are attracted to yellows, oranges and reds." He also suggested people to use amber lights near their houses and make sure those lights are properly enclosed in a full cut-off fixture.

We have already experienced the use of some luxurious lights with sensor that turns on when we enter the room and goes off once we leave. Such motion-activated sensors can be implemented in our streetlights too.

But above all, awareness campaign is the most important step towards mitigating light pollution as people hardly have any knowledge on how human-created artificial lights are destroying the wildlife as well as local biodiversity and ecosystem and how can we control the unrestricted use of lights to diminish the problem.

4. Conclusion

As this is a new topic of research, very less is adventured yet regarding the hazards of light pollution. Further advanced studies are required to know the gravity of the current scenario and future directions to abate the nuisance triggered by it. Modern light sources must be invented that might pose less threatening to the ecosystem. Awareness campaigns may also do their part.

Last but not the least, a little bit of willpower in addition to knowledge and awareness is the most essential source of our strength in our fight against all odds to protect our beloved biodiversity worldwide. Together we can become the guardian of our Mother Earth, safeguarding her from the verge of destruction.

5. Acknowledgement

I would like to express my special thanks of gratitude to the Prinicipal ma'am Dr. Maitreyi Ray Kanjilal and my teacher Dr. Debjani Das (Ghosh) ma'am,who gave me this opportunity to write this article on Light Pollution and how it affects the wildlife and ecosystem. Secondly I would also like to thank my parents who helped me a lot in finalizing this article within the limited time frame.

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CONTINENTAL DRIFT LEADING TO DIFFERENT CHALLENGES

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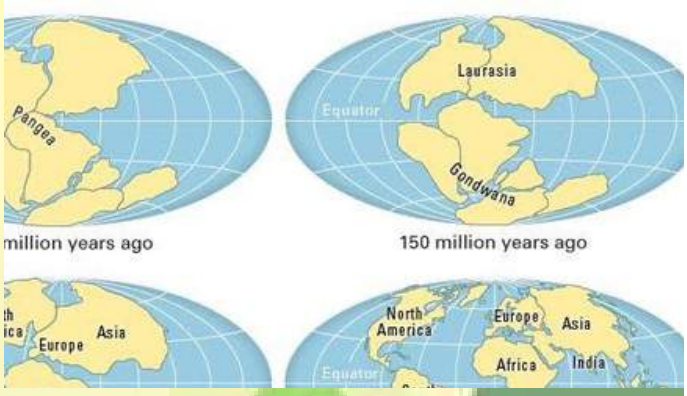
Long back age, about 250mya, all the continents appeared as a single land mass called Pangea surrounded by a single ocean Panthalassa. Life had already started on earth , about 3.5 bilkhon year ago. Due to movement of the tectonic plates, this while landmass got split into two landmasses namely – Laurasia and Gondwana. Due to further movement of the tectonic places and other catastrophic changes going on, these two landmasses movement apart and formed seven continents that we know today. This shift is called continental drift.

With the separation of the continents , the animals and vegetation living there also git separated. This caused similar animals to adapt differently in their new habitats due to changed climate and weather patterns, food patterns, habitat patterns etc.

The marsupials of Australia are a stunning example of different species formed due to continental drift. Marsupials and opossums coexisted in Americas but due to continental drift, they got separated and marsupials evolved as pouched animals such as kangaroo, koalas, etc and opossums evolved without pouches but do have a tiny flap that are not so prominent.



The Koalas or koala bear are arboreal herbivorous marsupials native to Australia. It is easily recognizable by its stout, tailless body and large head with round, fluffy ears and large, spoon-shaped nose. Koalas are regarded as Endangered species on 12th February 2022 , according to IUCN Red List. Koalas are facing a high risk of extinction by 2050 due to mass deforestation with their number decreased to 32,065 – 57,920 in 2022 down from 45,745 – 82,170 in 2018. The numbers show a disturbing trend with 30% decrease in overall populations.

Koalas lives in eucalyptus trees and are their main food source. Australia is the only developed country to be on the deforestation hotspot list. A significant drive for tree clearing is the cattle industry in Australia as cattle require large amounts of land and are a massive industry. There are 826 known species of eucalyptus trees, and 812 are only known to grow in Australia. Almost 25% of these tree species are threatened by extinction. The removal of laws protecting koala forests led to the bulldozing of more than 5,000 hectares of koala habitat in the NSW districts of Moree and Collarenebri at a rate of about 14 football fields a day. When those trees are cleared, koalas are killed when the trees fall down or when they are crushed by bulldozers.They also die when they are forced onto the ground to find new habitat, because they become vulnerable to attacks by dogs and collisions with vehicles.They also become stressed, and thus become more susceptible to contracting diseases like Chlamydia.

Thus obtaining land for large - scale urbanization and industrialization has led to the cutting down of trees in Koala habitats that led to their destruction in numbers.

On the other hand, their native marsupial brothers Opossums are members of the marsupial order , endemic to the Americas. They separated from Australian marsupials due to continental drift. Opossums should not be confused with the Australasian arboreal marsupials . The opossum is typically a non-aggressive animal. Opossums are generally found in areas like forests, shrub land, mangrove swamps, rainforest and eucalyptus forests.

Virginia Opossums are considered Least Concerned species by IUCN Red List, 2022. The impact of deforestation to give place to productive activities (e.g., livestock system and cropping) and construction of large cities has resulted in the extinction of wildlife species due to habitat loss and fragmentation of their populations. However, some species, such as medium sized opossums of the genus Didelphis (opossums), can adapt to human-modified landscapes due to their ability to exploit a wide range of resources and environment.Opossums' ability to thrive in different environments enabled them to become synanthropic species, benefiting from resources (e.g., food and shelter) available in human-modified areas .

Conclusion: Thus we see that being separated from the same mainland, Koala and opossums adapted differently to different geographic areas. They responded differently to the phenomenon of deforestation and hence have different IUCN status, one being Endangered and other being Least Concerned. So, we can conclude to some extent that continental drift that led to origination of different adaptable characteristics in once similar organisms have some influence too in encouraging man - animal conflict or to be more specifically, influenced their behavior towards deforestation.

What are alien species?

Invasive alien species are plants, animals, pathogens and other organisms that are non-native to an ecosystem, and which may cause economic or environmental harm or adversely affect human health. In particular, they impact adversely upon biodiversity, including decline or elimination of native species - through competition, predation, or transmission of pathogens - and the disruption of local ecosystems and ecosystem functions.

Introduction of Alien Species

Chandrima Sarkar, sem 3 Hons

Invasive alien species are species that have been introduced, either naturally, accidentally, or intentionally, into an environment that is not their own. After a certain amount of time, they adapt to their new environment and begin to colonize it. Such species are the second biggest cause of loss of biodiversity in the world, according to the United Nations Development Programme (UNDP).

Below, we take a look at some of the most harmful.
Globalization has opened up new places, cultures, and people to us. However, it has also given us access to animal and vegetable species that are extremely harmful to biodiversity, such as the Asian giant hornet (Vespa mandarinia) which appeared unexpectedly in North America in 2019. Such incursions are increasingly frequent, and are one of the main threats to the survival of one million of the world's species, according to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).
A biological invasion can also have an impact on human health, since several species can transmit disease, cause allergies, and even be poisonous. The impact on the economy can be significant, leading to a reduction in or even the disappearance of fishing, livestock breeding and crop cultivation, and damage to the tourism industry.
Not all introduced species are invasive. Some of them are unable to adapt to their new environment or spread freely, as is the case with many farm animals and garden plants, meaning that they are not a threat to the area. Others acclimatise and spread without damaging the ecosystem, such as potatoes and corn, becoming established species

How invasive species are introduced?
Exotic species travel around the world in the most unexpected ways, taking root in places that are thousands of kilometres away from their natural habitats. This is sometimes the result of human intervention — whether intentional or not — and sometimes caused by natural phenomena.

Below, we look in more detail at some of the causes linked to human activity:

1.The trade in wildlife :
Trade in exotic plants and animals is the main cause. Illegal trafficking of wildlife is a crime that turns over between 10 and 20 billion euros a year, according to the Worldwide Fund for Nature (WWF).

2. Tourism :
Visiting other countries contributes to the spread of foreign species, whether intentionally or otherwise.

3. Hunting and fishing for leisure :
In the past, these two activities were responsible for the introduction of animals such as the barbary sheep and the catfish across large parts of Europe

4. Transport and international trade :
Invasive species often travel hidden away in aircraft holds, shipping containers and ships' hulls.

5. Abandoned pets :
Raccoons, monk parakeets and red-eared slider turtles are examples of exo pets that have colonised ecosystems after escaping or being abandoned.

6. Crops and the fur industry :
The fashion industry and horticulture have also been gateways for mammals such as the American mink in Europe, and for plants such as the erect prickly pear in Africa and Oceania.

Examples of Invasive species :

There are many insects, animals and plants that have spread across the world , endangering biodiversity ; like American mink (Neovison vison), Hottentot fig (Carpobrotus edulis), Zebra mussel (Dreissena polymorpha), Red swamp crayfish (Procambarus clarkii), East Asian arrowroot (Pueraria montanalobata).

How to control and reduce the impact of invasive species :
The introduction of these species has a detrimental effect on the environment, but also on food safety, the control of diseases such as malaria and dengue fever, and on the economy. The IPBES estimates that in Southeast Asia alone, invasive species are responsible for the loss of $33.5 billion per year.

This harm could be largely avoided or mitigated by applying a diversified strategy that takes into account the following points:

- Legislation to prohibit imports of exotic species.
- Prevention through greater vigilance of entry points.
- Detection and rapid response to avoid species becoming established.
- Eradication of invasive species that have successfully spread.
- Pest control where eradication is not possible.

Invasion of Alien Species

Tanusree Chakraborty,
Sem 3,Hons

It has been noted that they pose several threats to biodiversity and economic activities such as agriculture, tourism, and overall development. Invasion of alien species can even lead to human-wildlife conflict and diseases amongst animals and plants. They transform not only landscapes, but livelihoods as well.

In India, about 400 people are killed annually by elephants, many by carnivores. Thousands of livestock a killed by big Cats and hectares of agriculture areas are Damaged by herbivores.

Annually huge funds are allocated for preventing the entry of wild animals into the villages around protected areas (PA) and for Compensation of conflicts.

NGOs dealing with these issues for a better knowledge about the current state of the problems and to find a way forward. The workshop was conducted under the five major themes:
(1) Human-carnivore interactions.
(2) human-Herbivore interactions.
(3) human-Macaque interactions.
(4) invasive alien Species management.
asive alien species'. It was conducted by Wildlife Institute of India on 23 and 24 July 2014.

Experts also raised concern about the fate of wild animals in human dominated landscapes.

With increasing landscape modification, chances of encountering these animals by humans as well as the negative interactions would increase.

Few traditional and short-term mitigation measures to keep the animal away from the human habitations and crop lands were also discussed.

A tentative list of invasive alien species of national concern in major ecosystems was developed by the group.

According to the working group,(MoEFCC) in the context of national bio-security should direct agencies and concerned ministries to brainstorm over the issue of biological Invasions as it is one of the 20 Aichi Biodiversity targets.

The group also suggested establishment of task force for managing invasion in every ecosystem. Qureshi expressed his concerns for using bio-control agents without controlled trials as it could result in additional introduction of alien species.

For example, when elephants forage on crops, seals damage fishing nets or jaguars kill livestock, people can lose their livelihoods. Retaliation against the species blamed often ensues.

Examples:

Some of the invasive species found in India are: Alternanthera philoxeroides, Cassia uniflora, Chromolaena odorata, Eichhornia crassipes, Lantana camara, Parthenium hysterophorus, Prosopis juliflora and others.

Invasive plants such as Lantana camara and Chromolaena odorata are emerging as a serious threat, especially to natural and agricultural landscapes.

Lantana (Lantana camara), Carrot grass or Congress grass (Parthenium hysterophorus), Yellow fever mosquito (Aedes aegypti), and Giant African land snail (Lissachatina fulica), four of the worst invasive species in India, impacting diverse sectors such as the environment, agriculture.

Among the introduced, few species such as Water Hyacinth(Eichhornia crassipes), Water cabbage/lettuce (Pistia stratiotes), Giant Salvinia (Salvinia molesta), Nile/red tilapia (Oreochromis niloticus), African catfish (Clarias gariepinus), Thai pangas (Pangasiandon hypothalamus) and common carp (CyCyprinuscarpio) have emerged as a great threat to Indian aquatic diversity and pose a serious threat to regional and local economy.

ACCORDING TO OTHER CASE STUDIES :

1.Studies from Ganga river have disclosed that there is a constant increase in the yield of alien varieties such as cyprinus carpio, Pangasianodon hypophthalmus.

2. In Kerala, the high occurrence of tilapia species in inland waters was reported, due to which the native species such as Puntius dubius and Labeo kontius faces local extinction.

3. In Yamuna, the occurrence of tilapia, African catfish, Silver carp and Gambusia is higher and the biomass is spiralling every year.

4. Water hyacinth clogs several water ways of rivers and lakes which leads to flood during monsoon. Water hyacinth leads to eutrophication, affects fishing, outbreak of mosquito borne diseases and afaffects aesthetic value of inland wetlands.

5. Water cabbage/lettuce (Pistia stratiotes), Giant salvinia (Salvinia molesta) invasion clogs the irrigation canals and agricultural fields. It also affects the aquaculture & agricultural yield.

6. Acridotheres tristis (Linnaeus, 1766) is one of the worst invasive bird species worldwide due to its ability to outcompete many native cavity-nesting species as well as being an agricultural pest.

7. Pila globosa is widely used as a food source for humans and livestock and as a control for weedy aquatic in its native range. Pila globosa has been reported as introduced outside its native range within India.

Unveiling the Dark Reality: Animal Abuse in India

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Sem 5 hons, Zoology Department

The story of 'Cruelty to Animals' in India is rising day by day. It is leading only towards a huge negative impact on mother nature. This type of Man-Animal conflict just shows how insensible we are, how inhuman we have become. Nothing but awareness followed by habitat management, sensible behavior towards animals can help to overcome this. As a zoology student I always feel that , more and more people should know what animal abuse is. Just because they don't talk like us, it doesn't mean it doesn't hurt.

We always hear now a days that, elephants forage on crops, seals damaged fishing nets, jaguars killed livestock. Ever thought of why they are doing it? To be precise they are forced to do it. And the cause? Yes, you guessed it right, we humans. What behavior of us forcing it? Obviously deforestation, agricultural expansion , overgrazing by livestock, human settlement. Things were not like this always, a beneficial mutualism and dynamic relationship between people and animals is always seen. Now, lets focus on some true incidents of animal abuse that occurred in India in recent times.

Behind the veil of progress and development countless animals in India suffer silently at the hands of abuser. The most commons are street dogs and cats.

The forms of abuse are varied and heart wrenching. Surely we all heard that story of tying "Patakha" to the tail of a poor street dog at Diwali times. Or beating a starved street dog or cat who accidentally 'stole food'. Ever heard of poisoning a pregnant female street dog just because it will increase dog population in that particular locality. This happens and after all this we call us "HUMAN".

India is truly blessed to have a diverse range of wildlife, but sadly they face numerous threats like poaching, illegal wildlife trafficking, habitat destruction.

Factory farming, where animals are confined in cramped space, is another nightmare for animals. Cows, pigs, chickens endure painful procedure without proper anesthesia such as dehorning, de-beaking, castration. They face immense physical and physiological stress. We can ensure their good physical and mental health by supporting ethical and sustainable farming practices.

These are the major abuses happening all over the country. There are some unbelievable instances of animal cruelty in India:

- Stray dog thrown by man into the Upper Lake of Madhya Pradesh.
- Pregnant bison killed for its meat in Malappuram.
- Kitten burnt alive in Hyderabad.
- Ayodhya cow rape.
- Hanging of monkey in Telengana.

The list is never ending. Only a few of these cases are reported. No one knows the exact number.

What we can do as responsible humans to prevent this? We can protest. If that is not enough we should report any kind of abuses to local police station or Animal Welfare Board of India. You can mail PETA India. Or call 9820122602 for urgent need of veterinary care. And surely, next time on noticing a hungry stray animal please feed them. GOOD KARMA ALWAYS PAY BACK.

A Bear is also Dear

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We all take care of our dear ones with utmost care and affection because they are a part of our lives. Similarly, the animals are also a part of our ecosystem that is why they should not be ill treated. There are various types of conflicts increasing day by day and human- bear conflict is one of them. With proper research on management strategies these conflicts can be converted into coexistence.

When we talk about human- bear conflict or any other conflict we become more concerned about our survival and our protection from the threats raised due to the conflict. But do we ever think about the issue from animals' perspective? What about their survival and safety? Why are they getting furious and attacking us? The answer is simple; when the bears don't get access to their basic needs i.e food, water and shelter; the conflict begins. And we, the humans are solely responsible for the conflict. Let me tell you how.

- Deforestation has resulted in loss of their habitat so the bears are seen to venture into human settlement in search of food leading to conflict.
- Climate change and habitat loss can disrupt bear food sources, pushing them to seek alternative food in human inhabited areas.
- Improperly stored food, garbage or pet food can attract bears to come to human habitats.
- It has been reported that years with poor natural food availability forces bears to venture near human habitation and they hardly return the next year if natural food condition improves.

Human bear conflict can have negative impact on humans, bears as well as on the ecosystem.

- Incidence of bear attacks has been reported from United states, Canada, Russia, Sweden, Finland and Romania.
- Reduced human tolerance of the bears has resulted in needless killing of the bears.
- Bears sometimes might prey on livestock and damage crops leading to economic loss.
- In places like Alaska, Borneo, Finland, Greece, Peru etc. bears are tourist's attraction. Conflict can deter tourists which can in turn impact tourism revenue.
- Prolonged conflicts can lead to psychological stress specially among those who have experienced any kind of loss due to attack.

Now the question that may arise is that how can a bear be dear? What is the need to conserve them when we can simply end the conflict by killing the bears. Well, bears play a crucial role in maintaining the balance of an ecosystem in various ways.

- Bears help in seed dispersal by eating fruits and depositing the seeds in different locations through their faeces.
- Bears help to regulate prey populations by controlling the numbers of animals like elk, deer and fish
- Bears modify their habitats by digging, overturning rocks and creating depressions which can create micro habitats for various plants, insects and other animals thereby enhancing biodiversity.
- Bears sometimes feed on dead leftover animals and thus help in cleaning up carcasses, preventing the spread of diseases.
- Grizzly bears act as a keystone species. Canadians recognize Grizzlies as a national treasure.

There are 8 bear species in the world. Given below are the bear species for which conflict has been reported.

Andean Bear

This bear attacks mostly cattle and sheep that comes to its habitat distribution range.

Brown Bear

The conflict between Brown Bear and human results in damage to livestock, pets, captive game animals, fish, beehives etc. They search for anthropogenic food sources in human settlements.

Sun Bear

They feed on variety of fruits and horticultural products. Although little information is reported on conflicts with Sun Bears,
they may sometimes attack farm house in search of rice, sugar, palm oil etc.

Sloth Bear

Attacks humans and they can also cause damage to agricultural fields.

Asiatic Black Bear

The conflict between humans and Asiatic Black Bears may result in crop raiding especially of corn, potatoes and fruit trees. Bark stripping which causes damage to tree trunks has been reported in Japan.

American Black Bear

They frequently attack livestock and apiaries. They regularly seek out garbage, pet food, bird feeders and other anthropogenic food and damage human property

Polar Bear

Damage caused by polar bears is mainly related to human food stores, vehicles, attack on domestic dogs.

With proper management system human bear conflict can be resolved to some extent.

- When local inhabitants are well aware about bear biology, occurrence and prevention of human bear conflict; management strategies can give best results.
- Removal of attractants such as bird feeders, pet food and carcasses is essential to avoid human bear conflict.
- Bear proof bins can be used to prevent access to unprotected resources such as garbage. And electric fences for protecting livestock.
- Landscape planning for wildlife travel routes and corridors may be used to direct animals around or away from human development.
- Providing compensation for property or livestock losses caused by bears is done by Government.
- Local communities can set up a "neighbour network" to alert each other and wildlife managers about bear presence.
- Sometimes bears can be kept away from attractants temporarily using tools like flashing lights, loud noises, or chemicals.

Conclusion

The management strategies can work best if we have positive attitude towards bears. There are various lethal methods (shooting, trapping and poisoning) and non lethal methods (translocation of bears) available which aim to reduce bear density. These methods should be avoided because they can have strong negative impact on bear population. Scientists are trying to figure out effective ways for human bear coexistence and in some places coexistence is successful. Our main focus should be to reduce the human bear conflict not the bear population so as to maintain a healthy relationship between humans and bearsbears.

HARGILA, BIRD OF ASSAM : A SPECIAL CASE OF MAN -ANIMAL CONFLICT TURNED TOWARDS CONSERVATION

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Known locally as hargila (derived from the Assamese words "har" means bone and "gila" means swallower, thus "bone-swallower") and considered to be unclean birds, they were largely left undisturbed but sometimes hunted for the use of their meat in folk medicine.Once found widely across southern Asia and mainland southeast Asia, the greater adjutant is now restricted to a much smaller range with only three breeding populations; two in India, with the largest colony in Assam, a smaller one around Bhagalpur; and another breeding population in Cambodia.The greater adjutant is a huge bird, standing tall at 145–150 cm (4 ft 9 in – 4 ft 11 in). The average length is 136 cm (4 ft 6 in) and average wingspan is 250 cm (8 ft 2 in).The huge bill, which averages 32.2 cm (12.7 in) long, is wedge-like and is pale grey with a darker base. The wing chord averages 80.5 cm (31.7 in), the tail 31.8 cm (12.5 in) and the tarsus 32.4 cm (12.8 in) in length. A white collar ruff at the base of its bare yellow to red-skinned neck gives it a vulture-like appearance. In the breeding season, the pouch and neck become bright orange and the upper thighs of the grey legs turn reddish. Adults have a dark wing that contrasts with light grey secondary coverts. The underside of the body is whitish and the sexes are indistinguishable in the field. Juveniles are a duller version of the adult. The pendant inflatable pouch connects to the air passages and is not connected to the digestive tract.Like others storks, it lacks intrinsic muscles in the syrinx and produces sound mainly by bill-clattering, although low grunting, mooing or roaring sounds are made especially when nesting. Often found to involved in rivalry with other fellow birds for food , nests or mate .

Skirmishing with neighbors is a part of life for Hargila, but conflict with human neighbours is more complicated , and has contributed to drastic population declines across the historic range. Previously this birds would have spent their time feeding in wetlands or scavenging carcasses across the countryside. But now , they refuge mainly on garbage damps to collect food and make nests in trees in resident public areas. People often treat this messy birds as bad omen or disease carrier. Thereby to get rid of this birds they often cut down the nesting trees. As a result, the already endangered population of Hargila faced more treats as they nested across parts of Assam.

Dr Purnima Devi Barman,a prominent biologist in Assam, identified the greater problem that lies with the cutting down of trees and the subsequent fall of population of greater adjutant storks. With her great effort and initiative she formed a army of hargila protectors comprising of about 10,000 women. The task was not easy. She started a decade ago. Initially people was not interested about the role and protection of Hargila birds. She began visiting villages and tried interpreting the roles of hargila as cleaner birds rather than a bad omen. Slowly people got motivated and began to understand the greater roles of this bird. They began conserving the bird by incorporating the conservation strategies in their culture and workplace.(Eg. Incorporating the design of birds in their traditional dress Mekla-chaddor).

Initially there was 28 nests left in Assam when Purnima Devi started her work. But thanks to her effort and her army, now about 200 nest are found across Assam and comprise a global stronghold of greater adjutant stork population. Therefore, people with a little endeavor can make a large impact in reducing the man human conflict and also proceed toward a greater conservation of biodiversity .

AARIBADA : THE MASS NESTING OF OLIVE RIDLEY AT COASTLINE OF ODISHA

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The Olive Ridley Turtle, Lapydocheys olivacea known as pacific ridley sea turtle. One of the unique of its life cycle is ARRIBADA, where thousands of females come together on the same beach to lay eggs over of period of 5-7 days in conical nest about 1 and ½ feet. Coastlines of Odisha in the first quarter of every year witness "ARRIBADA" when over half a million turtles gather for mass nesting. In recent genetic studies have demonstrated that turtles return to their region of birth to breed. Olive ridley migrates from to coastline waters of Odisha (Rishikulya) from Indian ocean near Srilanka. They are protected by WILDLIFE Protection Act,1972: Schedule1 & Rapid Action Project Family. But in last seven years dramatically decreasing in mass nesting and migration is inhibited due to various environmental threats (cyclones, climate change, predation) and Anthropogenic threats (trawling boats, gill net, non-intentional capture, tourism). Many sanctuaries like Gahirmatha Marine Sanctuary and local people takes several steps like harvesting the eggs, monitoring, guard the nest, releasing hatchlings. In last year 2021, mass nesting and migration of olive ridley is increased due to absence of human invasion and tourism. The objective of study is to better understand the ARRIBADA and what are the main reason of disintegrate of ridley turtles with their conservation modes.

INTRODUCTION

The olive ridley turtles are considered as the smallest and most abundant of all sea turtles found in the world, with an estimated 800000 females nesting annually .Females are heavier but rarely weigh over 50kg. The adult males are of significantly less body weight, about 33kg. Sexually dimorphic and sexually matured at14-15 years of age. They get their name from olive green coloured heart shaped carapace. Sex determination is somehow manipulative. It has been found that eggs incubated 31°-32° C will produce only females, 28 or less will produce only males. Incubation period is usually 46 to 10It is assumed that they can detect both the angle and intensity of the earth's magnetic field. Dive to depth of 500ft to forage on benthic invertebrates. Remarkable navigators and usually return to a beach in the general area where they hatched. But they show extreme low rate of survival. 1 out of 1000 survives to reach adulthood.

MIGRATION

They usually migrate annually from pelagic foraging grounds to coastal breeding and nesting grounds and back. They are by and large found within 15km of mainland shores in protected, relatively shallow marine waters in coastal beach and estuaries, but occasionally occur in open waters over some parts of its range.

Genetic studies have revealed that Olive Ridley turtles return to their natal places for nesting and choses a nesting ground in close proximity with their natal site (Bowen and Karl 1997).

THREATS TO SURVIVAL

COMMERCIAL AND RECREATIONAL FISHING: Accidental killing of adults through entanglement in trawl nets gill nets, due to uncontrolled fishing during the mating season round nesting beaches is considered to be the most severe threat for the turtle.

BOAT STRIKE: Fast moving boats have the potential to cause marine turtle injury or death.

POACHING: Olive ridley turtles are still extensively poached for their meat, shell, leather and their eggs have a significantly large demand around the coastal regions.

PREDATION: The juveniles are exposed to predators like Feral dogs, Jackals, Hyenas, predatory and scavenging birds as well as Ghost carbs and Fiddler crabs and even local human communities.

HABITAT LOSS AND DEGRADATION: Coastal developments and exploitation and nesting beaches for pores can directly destroy or degrade beach habitats used as nesting sites particularly along the east coast of India (Pandav and Chaudhary 1999).

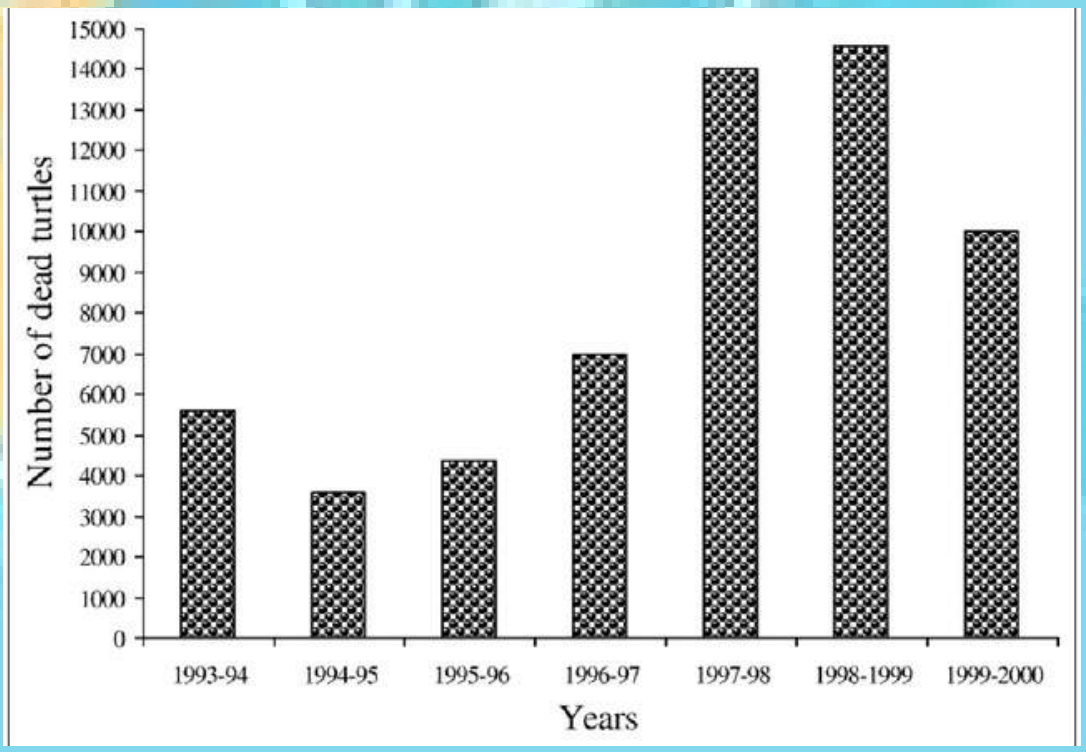
LIGHT POLLUTION: During night, hatchlings which use light cues to orient themselves to the sea get mislead or wrongly oriented due to light pollution.

GLOBAL WARMING AND CLIMATE CHANGE: Cyclones and associated storms can alter hatchling production in particular season. Climate change may affect the male- female ratio.

PRESENT STATUS:

Wildlife (Protection) Act, 1972	Schedule- I
IUCN	Vulnerable
CITES	Appendix- I

POPULATION TREND



CONSERVATION STATUS

Olive Ridley turtles are considered threatened as they have declined by more than 30% from historical levels and due to there few remaining nesting sites in the world. Hence, they are categorized as Vulnerable by IUCN.

Enforcing the use of TED or Turtle Excluder Devices in the shrimp trawling industries has also proved effective in some areas.

Gahirmatha coast serves as the natal nesting beach for millions of turtles and is regarded as the world's largest known rookery of these turtles. Government of Odisha has declared the beach and its adjoining waters as "Gahirmatha Marine Sanctuary" in 1997. The protected area includes 1408 sq. km of seascape and 27 sq. km of land mass comprising of mudflats, sea beach and mangroves. This is the first and the only Marine Sanctuary of Odisha.

CRITICAL DISCUSSION ABOUT CONSERVATION

More efforts should be placed on understanding patterns of nest sites selection and how it may change due to climate change.

Efforts should be made to know about the ecological roles and impacts of climate change to their important diet species.

Initiatives and regulatory framework should e taken to reduce the threat which coastal fisheries pose to marine turtles by intentionally or accidentally catching them.

Modification of fishing hooks should also be made.

FUTURE SCOPE OF RESEARCH

Every year how the thousands of female Olive ridley turtles come together on the same beach migrating astonishingly great distance and about their social organisation is still known very little. Besides those facts, how the newly hatched baby turtles start migrating and later come to their natal places for nesting near their natal site is unknown.

REMARK

Over the last few decades, sea turtles have become threatened by human overexploitation, marine pollution. However, on a positive note, the
Rapid Action Project (RAP) at Rushikulya, carried out between January to May 2004, played a significant role in the significant increase in
mass breeding of Olive Ridley turtles.

- After the beach cleaning program in 4-kilomerer-territory resulted in sporadic increase in nesting of Olive Ridley Sea Turtles.
- The nesting become sporadic after 14th March 2004 and in total, approximately 1,20,000 nested at the Rushikulya rookery over a period of four to five nights due to beach monitoring.
- During this period, a total of 150 nests were relocated on the mass-nesting beach.
- At least 500,000 hatchlings were saved from dying due to desiccation or predation by avian predators.

Commendable initiatives like RAPs must be continued in future for survival of the sea turtle populations. Community based conservation will be more effective in this rookery.

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Conclusion

Human-Wildlife Conflict (HWC) Mitigation Strategy is a critical area of focus for promoting sustainable coexistence between humans and wildlife. HWC can negatively impact both humans and wildlife, including economic losses, damage to property, threats to human safety, and negative impacts on wildlife populations and their habitats. Effective HWC mitigation requires collaboration and coordination between government agencies, NGOs, local communities, and other stakeholders, as well as a focus on sustainable and equitable solutions that consider the needs and concerns of humans and wildlife. By implementing these strategies, a project proponent can promote sustainable coexistence between humans and wildlife, ensure the long-term benefits from their projects, and reduce the impacts on natural resources. The inputs of certified experts during reporting of mandatory assessment processes such as (Environmental Impact Assessment) EIA or EMP and planning such as wild conservation plan or forest clearance has proven beneficial in the overall success of developmental projects.

Epilogue

Thank you for taking the time to read Zootopia. We hope that it will inspire you to take action to protect our planet and the incredible diversity of life that it supports.

We live in a crazy society where we have to explain why killing animals is wrong. We need to change our perspective so that there will be a world where the animals are no longer treated as belongings but as beings with feelings.

ZOOTOPIA