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TABLE OF CONTENTS OF THE FIRST ISSUE

A total of 31 articles were submitted in a span of two and a half months, while 6 were accepted for publishing, a total of 18 articles were rejected, and others articles are currently under consideration. This amounts to a rejection rate of around 75%. This only goes to show that we are committed to ensuring high scientific standards.

The philosophy of the journal is to ensure that financial means do not remain a barrier for science, and that good science needs to be free, open and accessible to people from all walks of life. This commitment is showcased in the diamond open access model of the journal.

We hope you all will remain ambassadors to the ideal that sharing knowledge freely is not only a matter of ethics but also a catalyst for progress. And by breaking down barriers to access, we all hope to inspire a new generation of researchers and conservationists who can build upon the foundation of open knowledge.

We request your continued support in spreading the word about our journal and encouraging your peers to submit manuscripts that cover different aspects of wildlife research and conservation. Your contributions are vital in advancing our mission and fostering interdisciplinary dialogue among wildlife researchers and conservation practitioners.

Dr. Mewa Singh
(Editor-in-Chief,
Journal of Wildlife Science)

CHURDHAR WILDLIFE SANCTUARY :

Where Nature's Bounty Meets Cultural Reverence

-Priyanka Sharma, B.S. Adhikari & Salvador Lyngdoh

The Churdhar Wildlife Sanctuary is situated in the Trans-Giri hill ranges of Sirmaur and Shimla districts in the state of Himachal Pradesh, covering an area of 66.7 km². Established in 1985, the Sanctuary aims to preserve the biological wealth and floral diversity of the Panchmuda Range, which encompasses the highest peak (Churdhar) in the southern part of the state. The Sanctuary spans a broad altitudinal spectrum from 1900 m to 3600 m, supporting a wide array of plant and animal life adapted to different elevations. Its unique geographical location, undulating topography and diverse climatic conditions have resulted in the formation of rich and fascinating vegetation. Here, one can explore enchanting landscapes that encompass the Himalayan moist temperate forest, Himalayan alpine temperate pasture, moist sub-alpine, and dry alpine scrub. Dominated by the Himalayan moist temperate forest, it shelters endangered tree species such as *Taxus contorta*. The Sanctuary also holds a medicinal herb treasure, including threatened species such as *Fritillaria cirrhosa*, *Trillium govanianum* and *Dactylorhiza hatagirea*. This Sanctuary unfolds as a haven for avian enthusiasts, with the majestic Himalayan Monal *Lophophorus impejanus* gracing its skies. While on the forest floor, the elusive musk deer, among other mammals, is a rare and precious inhabitant in this protected habitat.

Churdhar, commonly known as Churichandni (Bangle of Snow), stands as one of the highest peaks in the Shivalik Range within the subtropical Himalayas, holding immense historical and religious significance. Mentioned in various Hindu scriptures and entwined with mythological stories, the mountain is believed to be a resting place for Lord Hanuman during his quest for the Sanjeevani herb as described in the epic poem Ramayana. At its summit, it is believed that Lord Shiva, in the form of Chooreshwar Mahadev (also known as Lord Shirgul), resides. A remarkable statue of Lord Shiva graces the summit, surrounded by prayer flags wrapped by believers and visitors. A temple

Fritillaria cirhossa

dedicated to the main deity, located a few meters below the summit, serves as a sacred pilgrimage site for residents. The peak attracts trekkers seeking panoramic views, providing sights of the Badrinath and Kedarnath peaks to the northeast and the expansive Gangetic plains to the south on a clear day.

In our study, a comprehensive and in-depth survey of the Churdhar Wildlife Sanctuary was conducted from June to October 2022. 230 sites were randomly selected along the elevation gradient for vegetation sampling. Details on traditional wisdom, including the local utilisation of plants, their vernacular names, parts used, methods of use and medicinal properties were also documented. A total of 387 species of plants from Churdhar Wildlife Sanctuary, comprising 268 herbs, 53 shrubs, 37 trees, 16 climbers and 13 ferns were recorded.

In the surrounding villages of the Churdhar Wildlife Sanctuary, the utilisation of traditional medicinal plants holds a significant role in the local culture and social life. Despite the availability of modern healthcare facilities, residents in the area continue to place their trust in traditional healers, considering their methods as safe. Traditional practitioners use various plant species as sources of medicine for providing common primary healthcare. During the field survey, an interesting revelation surfaced from both our field assistant and residents about the herb species *Primula gracilipes*, locally known as "Boj", which they use to cure stomach and eye-related disorders. This plant, found naturally in damp and humid environments, caught our attention as it was recorded only once during our study. According to local insight, in the past, people cultivated this plant near water sources, such as *bawdis* (wells). The traditional practice involved uprooting an individual from the group and replanting it near other water sources. However, the shift to modern practices, including water storage in tanks, has led to a decline in this cultural tradition.

One of the most popular folklore, as told by locals, revolves around a shepherd and a healing plant. Once, there was a local shepherd who found a plant that could heal wounds. He had lots of sheep and goats, so he tested the efficacy of the plant by cutting their legs. Miraculously, the limbs healed effortlessly. Confident in the plant's power, he did something extreme - he cut off his own head. Sadly, the healing plant was forgotten in his bag, and he couldn't fix himself. This tale of audacious experimentation and an ironic twist has become a poignant chapter in local folklore, revealing the mysterious allure of the botanical secret he sought. What makes this narrative all the more intriguing is the cloak of secrecy that surrounds the identity of the miraculous plant. Locals, despite sharing the tale in hushed tones, are hesitant to reveal the specific details of this plant.

Within the Sanctuary, a notable disturbance emerges in the form of livestock grazing by migratory and local herders, posing a significant threat to the regeneration potential of vital forests and the future survival of key tree species such as *Taxus contorta*, *Acer caesium*, and *Prunus cornuta*. Adding to the challenge, the unauthorised collection of herbaceous plants by nomadic *gaddis* and local residents, driven by commercial interests, further endangers the floral richness of Churdhar Wildlife Sanctuary.

The Sanctuary is not merely a biological treasure but also possesses profound cultural and religious significance. The local inhabitants in proximity to the Sanctuary hold invaluable traditional wisdom, emphasising the importance of initiatives to conserve and leverage this knowledge. It is through thoughtful and sustainable management that we can aspire to strike a balance, ensuring the longevity of both the natural resources and the cultural heritage embedded in the area.

Alpine pastures on the Ascent to Churdhar Peak

Spruce-fir forest

A note from the Authors:
This study was conducted as part of the project titled 'Basic Study Design for Biodiversity Assessment of Himachal Pradesh', with Dr. Salvador Lyngdoh, Scientist E, as the Principal Investigator and Dr. B. S. Adhikari, Scientist G, as the Co-Principal Investigator. We would like to thank the Himachal Pradesh Forest Department for all of their assistance and support. Additionally, we extend our thanks to the local communities and field assistants for their invaluable contributions, ensuring the smooth execution of our fieldwork.

About the Authors :

1.Priyanka Sharma is a Research scholar at WII interested in GIS and plants.

2. B. S. Adhikari: is a faculty member at WII. He has been involved in field research on phyto-diversity, community analysis and dynamics of plant communities and distribution of medicinal and aromatic plants in the western Himalaya for over 20 years. He is interested in developing predictive models of phenology patterns and species range shifts in response to climate change phenomena. He teaches courses on habitat ecology, ecosystem ecology and community ecology, and also contributes to developing the field skills of students in vegetation science at WII. He is a life member of the Indian Science Congress Association (ISCA), Kolkata and Ecological Research Circle (ERC), Kumaun University, Nainital.

3. Salvador Lyngdoh is a faculty member at WII.. He has been involved with using state-of-the-art techniques in population monitoring, behavioural study and conflict studies in Western as well as Eastern India. He has also been involved with ecological status surveys of large mammals of Western Arunachal Pradesh. His prior work ranges from investigation of socio-economic drivers of environmental change to animal ecological studies in tropical evergreen forests as well as high altitude Himalayas. His long-term interests include understanding movement ecology of mammalian carnivores in Himalayan ecosystems.

Primula gracilipes

A glimpse of the majestic yet treacherous Bhagirathi River near Gangotri Temple

CONFRONTING NATURE'S FURY:

Surviving the Unforeseen in the Himalayan Wilderness

-Deepali Bansal

I have been working in the landscape of Gangotri National Park (GNP) since 2022, visiting monthly from May to November each year to conduct experiments on assessing the impacts of climate warming on soil and ecosystem respiration and plant cover abundance under the NMSHE Phase II project. Additionally, I am also enrolled as a PhD Candidate at AcSIR-Wildlife Institute of India since January 2023. Each month brings its own views and challenges, and despite numerous visits, my enthusiasm remains high—perhaps even greater than during my first visit. Each trip presents unique intra-monthly variations (across years) and a new set of challenges.

On the morning of Sunday, June 30th, 2024, I began my journey from WII Dehradun with an intern, Aditi Kishore, and three field assistants. We reached Gangotri - a small temple town in Uttarakhand - that same night, experiencing less traffic than usual, likely due to the looming monsoon season. Upon arrival, the ferocity of the Bhagirathi River struck me; I had never seen it flow so intensely in the past twoyears. According to locals, the monsoon had still not arrived, and yet the flow was more than expected, mainly due to melting snow and glaciers.

On Monday, July 1st, we started our trek from Gangotri to Bhojbasa (a campground in Uttarakhand) at 7 am, observing the phenology of selected sub-alpine and alpine flora along the way. We reached Bhojbasa by 3 pm. Although it felt unusually hot, the sunny weather was a relief. The field assistants associated with the National Institute of Hydrology (NIH) and Wadia Institute of Himalayan Geology (WIHG) claimed that this July is surprisingly hotter than the earlier ones.

We began our research work the next day so as to complete it before the monsoon or before the peak festive season (*kanwar*). It rained intermittently on July 3rd and 4th, causing some concern, following which on July 4th, we learnt of a shocking news: the temporary bridge at Chirbasa - composed of two small, interconnected bridges - had been swept away. There was talk that two *kanwariyas* (devotees) had been carried away by the River, although this information was initially unconfirmed. A wave of panic and pain flowed through me, but as the team leader, I did not express these emotions as I could not have let the team's morale falter.

Immediately, I spoke with the local forest guard Anuj, who was the sole duty officer at Bhojbasa. He escorted me to the station from where we attempted to contact the forest officials at the Kankhu check post in GNP. Forest officer Rajveer informed us about the severity of the incident and confirmed that two *kanwariyas* had indeed been swept away, and their bodies had not yet been found. The bridges had collapsed, and the river flow was intense. Rajveer ji instructed Anuj not to allow anyone to trek down from Bhojbasa until the bridge was rebuilt, a process that might take 2-3 clear days. We had planned to trek down the following day, but had now put the plan on hold. Knowing that it was unlikely for the bridge to be rebuilt in this weather, I chose to maintain a positive outlook and encouraged the team to stay motivated.

The next morning, I approached Anuj once again to request him to contact the Kankhu check post and gather updated information. After hours of trying, we finally made contact with Rajveer ji at the Kankhu check post. He explained that they had been attempting to reach Anuj since 5 in the morning, but due to the bad weather, communication via walkie-talkie had been challenging. The entire National Park area had been put on high alert, and we were ordered to evacuate the area immediately. No one was allowed to proceed beyond Bhojbasa, and everyone had to return as quickly as possible. At that moment, I recalled the three women who had identified themselves as officials from National Geographic, visiting Gaumukh. One of them was over 51 years old and was feeling under the weather when we had spoken earlier that morning. The news and evacuation order hit me hard, knowing that they were still out there.

Ensuring that all the *yatris* began their descent towards Chirbasa, I could not shake off the worry that the River's flow typically increases after 11 am, and it was already 9:45 in the morning. Imagining a temporary bridge that might have been hastily constructed, and could potentially wash away again, was just my speculation in the midst of panic. Such situations often lack complete information and clear management at the ground level. All we could do was follow the orders given and proceed cautiously.

We were informed that Deputy Range Officer Mr. Harish was stationed at Chirbasa and would assist us in crossing the River, but uncertainty lingered about how this would be managed.

I was still worried about the three women from National Geographic, along with their trek guide and porter, who were still behind us. Once the rest of the *yatris* had departed, I began trekking down. Before leaving, I instructed Anuj to ensure the safe passage of the aforementioned three women, particularly the elderly one who was slightly ill.

The descent was challenging, exacerbated by heavy rain throughout the 6-kilometer trek. Despite our diligent use of rain covers, our bags were thoroughly soaked. As a researcher and PhD candidate, it was imperative for me to prioritise not only the team's welfare but also the safety of our scientific equipment. While this may seem trivial to some, it is crucial for our research endeavours.

Trekking down from Bhojbasa to Chirbasa amidst continuous rain

Upon arriving at the incident site, I saw the River where two bridges had once stood, now swept away. *Yatris* were soaked and shivering, with the SDRF team and forest officials on the opposite bank, including Mr. Harish, whom I recognised. The weather was severe, compounded by the presence of the *kanwariyas*, devout pilgrims carrying holy Ganga water, who were in no state to rest or eat. The River, previously calm, had turned ferocious in a matter of minutes, dislodging stones and boulders along its path—a stark reminder of its immense power and unpredictability.

By the time we arrived at 11:30 in the morning, SDRF officials were struggling to extend a rope across to us and secure it to a sturdy rock on our side. Despite several attempts, they struggled to successfully deliver the rope to us. Fortunately, our field assistant

Trekking down from Bhojbasa to Chirbasa amidst continuous rain

Daleb *bhaiya*, who had some experience in handling such crises, persisted and after two grueling hours, he and the officials managed to grasp the rope midstream and securely fasten it to a massive boulder on our side.

It was a tense moment as the trained SDRF official crossed the River, encountering three dips and collisions with the river's stones along the way. Panic spread among us witnessing his ordeal. Recognising our lack of training and experience in such hazardous circumstances, the SDRF officer secured a second rope an hour later. The boulder on which the ropes were fastened was dangerous, perched on a moraine that could collapse at any time. Despite the risks, we had no alternative but to proceed cautiously and optimistically. Yogi and Baba pilgrims were prioritised, with four to six people from both sides gripping the ropes tightly. Each crossing individual wore a helmet and harness attached to the rope, while those on the opposing bank pulled with all their strength. They crossed slowly, one at a time. I watched carefully as the boulder shifted a few centimetres. The River's flow direction fluctuated, moving from extreme left to right and centre, accentuating my anxious state of mind.

After some *kanwariyas* crossed, I was instructed to go next, though the three women from Nat Geo had still not arrived. Subconsciously worried about them, I wrestled with the desire to prioritise my own safety, knowing well that I could not have abandoned my own team. Aditi was visibly frightened—it being only her second trek and her first encounter with such a terrifying situation—and needed reassurance. Our assistants and I spoke with her, encouraging her that we would all soon be safe. Finally, I asked her to cross next, emphasising her safety as our priority at that moment. Reluctant yet understanding the urgency, Aditi was prepared by SDRF officials for her daunting river crossing.

She crossed the rope in a matter of minutes, and we felt relieved when she joined the SDRF and forest officials on the other side. Now it was my turn. Despite my fear, I knew I had to remain composed. I carefully balanced myself on the swaying rope while others pulled from the opposite bank. The wind whipped fiercely, and rain added to the chaos. The River roared below, stones colliding with a menacing sound. Gripping the rope tightly, I dragged my hand across its length until I finally reached the other side.

Group picture taken by the SDRF team to document those rescued during the operation

After this incident, amidst the mix of fear and adrenaline, I trembled as I walked and ended up straining the quadriceps muscles of my right leg and injuring my left knee. The remaining 9 kilometres of the trek were incredibly challenging as I had to hobble along with the support of a stick. It was a difficult ordeal, but I consider it as one of the scariest yet most thrilling adventures of my life. Throughout it all, I kept recalling the lessons my mother had taught me: never leave anyone behind, remain strong and positive regardless of the situation. She taught me that

even one weak link can shake the entire chain, and I couldn't afford to be that weak link, especially in such a critical situation.

It's truly heartbreaking to imagine the feelings of the person who witnessed two individuals being swept away. My thoughts are with them, and I join in heartfelt prayers for comfort and strength to their families and loved ones during their difficult time.

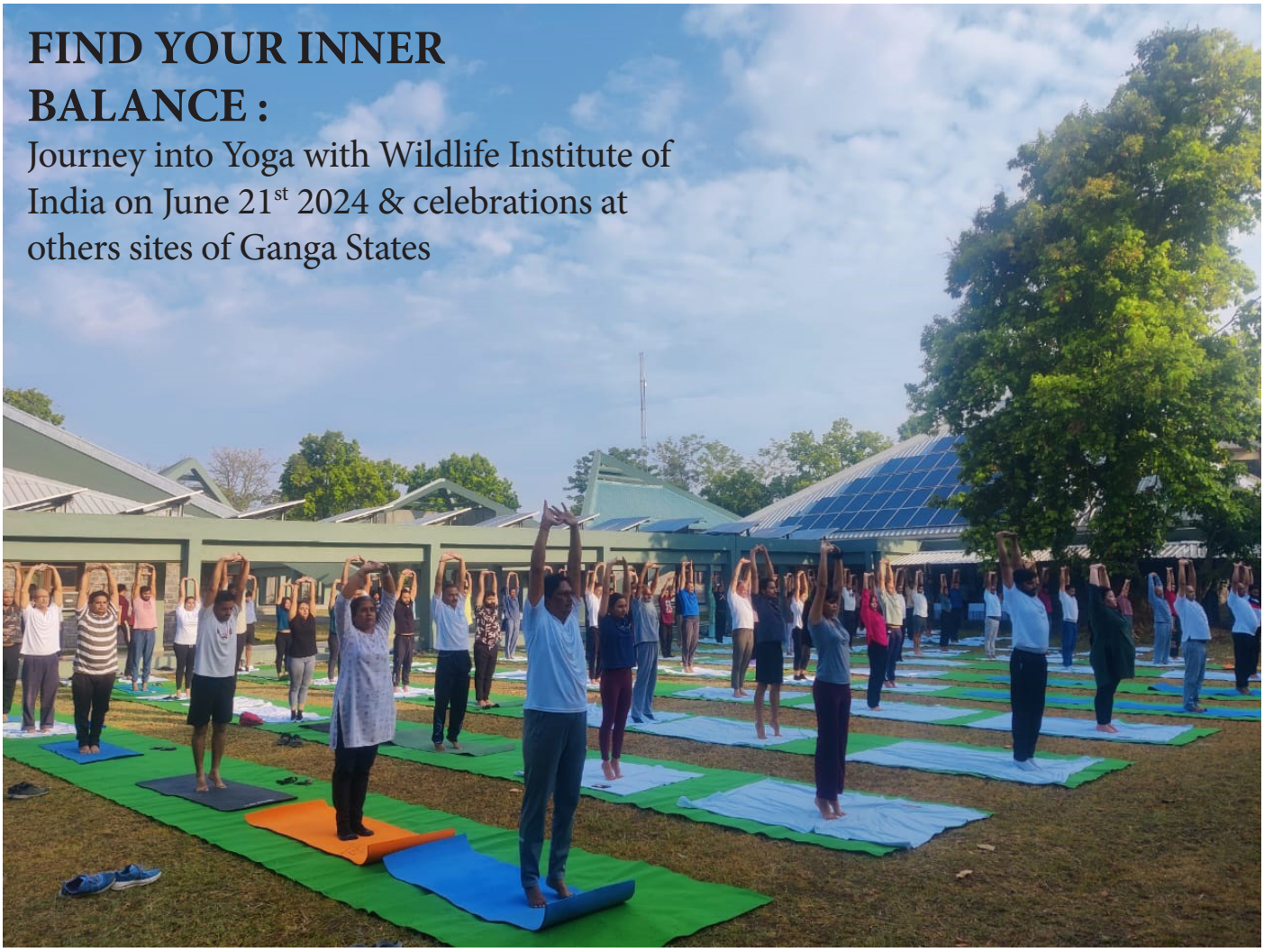
About the Author:

Deepali Bansal: is a Senior Project Fellow in the NMSHE Phase II project. She is a passionate researcher with a keen interest in understanding the effects of experimental warming on respiration and plant productivity in alpine meadows within the Western Himalaya. Her work aims to contribute to the broader field of environmental science, shedding light on the ecological consequences of climate change in these sensitive ecosystems.

A *Kanwariya* pilgrim crossing the River aided by the rescue team, secured with helmet and harness for safety

FIND YOUR INNER BALANCE :

Journey into Yoga with Wildlife Institute of India on June 21st 2024 & celebrations at others sites of Ganga States



The Wildlife Institute of India joyously celebrated International Yoga Day on June 21st, aligning with global endeavours to foster health and well-being through yoga. More than 130 participants performed yoga including the Registrar, scientists, participants from ongoing post graduate diploma courses, researchers, and other staff under the eminent guidance of a renowned Yoga Guru Atul Sharma. The celebration is significant for wildlife researchers and staff as it promotes physical and mental well-being, stress reduction, and a connection with nature. The practice of yoga can help alleviate the stress and challenges of research work, while also fostering a sense of community and teamwork among the participants. Furthermore, it serves as a reminder of the interconnectedness of all living beings and the importance of conservation and harmony with nature, aligning with the institute's ethos of wildlife conservation and research. This occasion showcased invigorating yoga practices including Surya Namaskar, Trikonasana, Bhujangasana, Vrikshasana, and Adho Mukha Svanasana etc.

Subsequently, the WII-NMCG project team celebrated International Yoga Day for stakeholders; more than 500 people performed yoga at 15 different locations to commemorate International Yoga Day, including parks, Ganga ghats, zoos, and other venues. The array of participants included forest department officials, various community stakeholders, field staff, and Wildlife Institute of India (WII) researchers from Sant Kabir Nagar, Gorakhpur, and Balwa Ghat. Participants also gathered in Kannauj, Varanasi, Vaishali, Morena, Chittorgarh, Kota, and numerous other places in Uttar Pradesh and Bihar. The workshops demonstrated the institute's steadfast dedication to incorporating yoga into everyday schedules, acknowledging its substantial advantages for mental, physical, and spiritual well-being. Yoga is well known for fostering deep relaxation and stress alleviation, as well as for strengthening muscles, increasing flexibility, and improving posture.

EXPOSURE VISIT FOR STUDENTS FROM WELHAM GIRLS SCHOOL

On April 6th, 2023, the Wildlife Institute of India (WII) warmly welcomed students and teachers from Welham Girls School for an Exposure Visit. Under the guidance of Dr. Sangeeta Angom, the event was designed to illuminate participants about the pivotal conservation efforts led by WII and to foster a profound connection with nature, igniting a passion for conservation among all participants.

Accompanied by Ms. Simran Aggarwal and Ms. Simren Dogra, Ms. Aishwarya Ramachandran led the visitors on an enchanting exploration of WII's diverse fauna and flora along the nature trail. Students embarked on an engaging quest to identify a minimum of 10 tree species and butterflies, immersing themselves in the vibrant tapestry of biodiversity that adorned the campus. An illuminating video presentation later offered captivating insights into the anecdotes and species found on the campus, as well as those encountered during the nature trail excursion.

The visit concluded with outdoor games centered around the biodiversity of the Ganga River Basin. Mr. Anshul Bhawsar, Ms. Ashmika Aggarwal and Ms. Aarti Chauhan conducted the activities like Wildlife Knock Clock, Wildlife Sticky Stamps, Ganga Quest and Aquaweb, where students delved into interactive experiences that provided valuable insights into the intricate ecology of aquatic ecosystems. Winning participants received the prizes, adding an element of friendly competition and excitement to the educational pursuits.

EMPOWERING TOMORROW'S CONSERVATIONISTS :

WII-NMCG's Ganga Biodiversity Conservation Workshop for students of Quantum University, Roorkee

The Wildlife Institute of India (WII) under the project National Mission for Clean Ganga (NMCG) conducted a transformative one-day workshop titled "Ganga Biodiversity Conservation" for students of Quantum University, Roorkee, dated May 6th, 2024. The workshop aimed at enlightening students about the diverse and intricate biodiversity of the Ganga River and its tributaries, while also acquainting them with the pivotal role of the Wildlife Institute of India in conservation efforts. The event drew 54 enthusiastic graduate students and 2 professors from Quantum University, and was a resounding success, blending educational experiences with interactive activities that deepened participants' understanding of riverine ecosystems.

The workshop featured a series of engaging activities, including immersive experiences along the Nature Trail, hands-on sessions in the Forensic Lab exploring wildlife conservation techniques, and a visit to the Ganga Library where students delved into research materials on river ecology and conservation strategies.

ECONOMIC LIFELINE OR ECOLOGICAL THREAT?

The Dilemma of Caterpillar Fungus

-Debaleena Chatterjee, Nitesh Goswami & B. S. Adhikari

Over the past few decades, there has been a global increase in the interest in Chinese Caterpillar Fungus (*Ophiocordyceps sinensis*) or "keeda jadi" in Hindi, from the high-altitude Himalayan regions, commonly known as "Yartsa Gunbu" which means *summer grass winter worm* or "Himalayan Viagra". The species is restricted to high-altitude subalpine and alpine meadows or grasslands above the timberline across the Tibetan Plateau and Indian Himalayan ranges. In India, this fungus is found in the alpine areas of Uttarakhand, Sikkim, and Arunachal Pradesh. Due to its proximity and accessibility to markets in Nepal and the Tibetan Autonomous Region of China, Uttarakhand has the largest volume of commerce out of all of these states, with prices per kilogram ranging from $20,000 to $40,000, or between ₹ 15 lakhs and ₹ 30 lakhs at current exchange rates. Since ancient times, the species has been mentioned in Chinese traditional medicine and Bhutanese indigenous medicine as having anti-cancer, anti-inflammatory, antioxidant, and aphrodisiac properties. It has been used to treat a wide range of ailments, such as diarrhoea, headaches, coughs, rheumatism, asthma, cardiovascular disorders, as well as renal and liver diseases. Due to the rapidly expanding global demand for the species and continuously rising prices in international markets, indigenous populations inhabiting higher Himalayan communities have found it to be highly lucrative, substantially improving their socio-economic status. The collection and trading customs that originated in the Kumaon Himalayan district of Pithoragarh in Uttarakhand have travelled to Joshimath, a sacred town in the Garhwal Himalaya and the gateway to the conservation area of Nanda Devi Biosphere Reserve, in the past twenty years.

Caterpillar fungus was designated as a non-timber forest product by the state government of Uttarakhand in 2018, in compliance with the Indian Forest Act, 1927, in an attempt to promote sustainable trade of the fungus and boost fair trade standards. While commercial exploitation of wildlife sanctuaries and national parks is strictly forbidden,

Good quality dried caterpillar fungus ready for sale

collectors are permitted to harvest caterpillar fungus from Reserved Forests through village-level forest councils. Until 2012, collectors had to turn in their stock to the state Forest Department for auction at Rs. 50,000 per kilogram and pay respective Van panchayats a royalty of five percent of the proceeds. The Forest Department and the Van panchayats have only held a few auctions since the regulations came into force, and neither the state exchequer nor the local collectors have profited from them. Currently, collection is allowed through a licensing system. The majority of the harvested fungus is transported out of the region, where local contractors and Nepali middlemen offer prices ranging from two to eight lakh rupees per kilogram (prices depend upon the quality and grade of the collected fungus, which is several times higher than what collectors can anticipate at legal village auctions.

People spend two to three months in the harsh climatic conditions of the meadows in search of the fungus. Fungus trade has supplemented subsistence farming and pastoralism as the primary means of revenue for many families. As a result, household income has increased, allowing for investments in property development, children's education, agriculture, healthcare, and other areas, thereby improving living standards and decreasing reliance on agriculture. Earnings from traditional livelihood systems are frequently surpassed by the profits generated by this seasonal activity, which spans from April to June. However, unsustainable harvesting practices have led to severe environmental degradation. Over-exploitation of the fungus is leading to its population depletion, damage to vegetation and soil structure, deforestation, habitat destruction, and pollution in the meadows. According to reports and field observations the resource is shrinking, and harvesting is becoming more challenging. Interviews with the local villagers indicated that the total quantity of caterpillar fungus acquired this year was 50–60% less than last year due to limited snowfall in Uttarakhand.

Research has shown that the winter temperature is a crucial factor in both its production and distribution. Consequently, significant winter warming may have caused its decline in all of its distributional territories, which include India, Bhutan, and Nepal. This situation demands careful consideration of the long-term health of alpine meadows and of their ecosystem in particular. A multifaceted strategy will be required to address this issue. For communities to become less reliant on caterpillar fungus, it is imperative to develop and promote alternative livelihood opportunities like low-impact community-managed eco-tourism and handicrafts. The implementation of sustainable harvesting protocols, regulations, and resource management initiatives will guarantee the long-term viability of the species and economic benefits. For example, Bhutan's Forest and Nature Conservation Act, Schedule 1 protects the species, and includes technical provisions governing rewards, fines, harvest times, quotas, and other factors to encourage sustainable harvesting. Regular training sessions and workshops are held nationwide to raise awareness.

Natural habitat of caterpillar fungus in Nanda Devi Biosphere Reserve

Un-mature stroma of caterpillar fungus

China has advanced tremendously in fungus-related research in the fields of immunology, biochemistry, ecology, molecular biology, medicine, and product development. China has designated the species as Endangered owing to the rapid decline in its natural population. Furthermore, China has claimed that it has optimised techniques for the artificial cultivation of O. *sinensis* to maintain the survival of the native populations. Given the substantial portion of the Himalayan border, India also possesses comparable scope and opportunities for such nation-building initiatives. Increasing public awareness about the ecological significance of the fungus and the negative consequences of overexploitation is essential. Protection under the Wild Life (Protection) and Biological Diversity laws, along with regular habitat monitoring, community management systems, fair distribution of trade benefits, effective resource governance, and training programs, will contribute significantly to promoting environmental sustainability.

About the Authors:

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Local villagers collecting fungus in the meadows of Nanda Devi Biosphere Reserve

FROM CAMPUS TO WILDERNESSES :

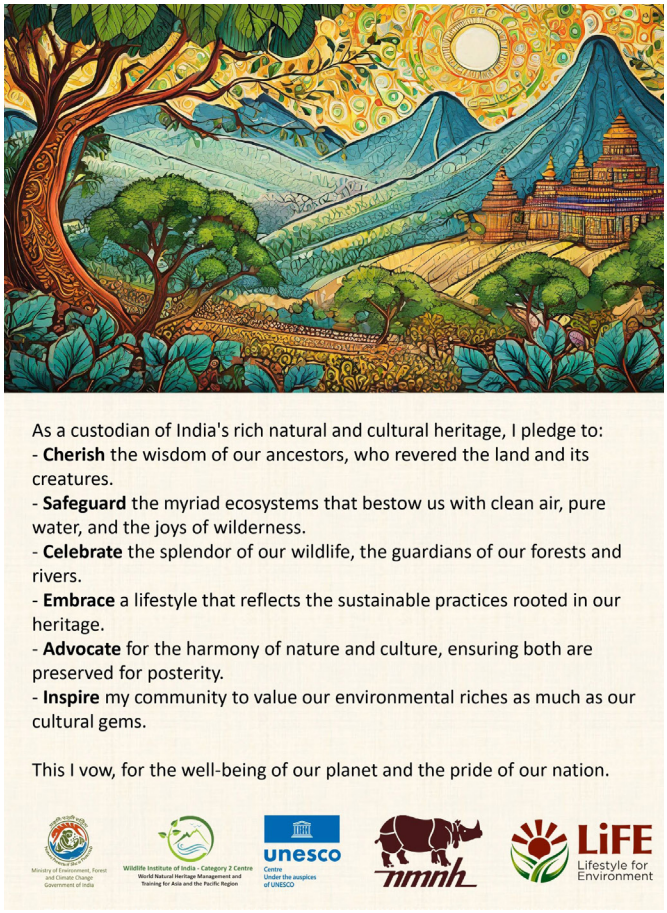
Celebrating World Heritage Day 2024

-Anuranjan Roy

Every year, April 18th marks a celebration of the cultural and natural heritage identified by UNESCO as belonging "to all the peoples of the world, irrespective of the territory on which they are located". On the occasion of World Heritage Day in 2024, the WII campus, schools, museums and Natural/Mixed World Heritage Sites across India were connected by this very special bond. Wildlife Institute of India – Category 2 Centre (WII–C2C) utilised the occasion to bring together all the above groups over a common interest in natural heritage, as much a part of our identity as cultural heritage.

Beginning on campus, WII-C2C organised "Connections: A Natural Heritage Quiz" which encouraged various team representatives within WII to think laterally, piecing together clue-filled questions to reveal interesting answers. The occasion also offered the attendees a window into the links between heritage sites and biodiversity conventions in a talk by Dr. Nehru Prabakaran followed by a discussion on the value of natural heritage by Dr. R Suresh Kumar. Simultaneously, in collaboration with the extensive school network of National Museum of Natural History (NMNH), World Heritage Day was being observed by schools across the nation through a natural heritage pledge, informational material and heritage documentaries provided by WII-C2C.

Art Contest participation in progress at Sawai Madhopur



The World Heritage Day 2024 Pledge

To a broad section of society, museums serve a critical role in shaping minds, young and old, acting as an interface for knowledge. The Regional Museums of Natural History (RMNHs) in Sawai Madhopur, Bhopal, Bhubaneswar and Mysuru boosted World Heritage Day 2024 celebrations by hosting talks, discussions and documentary screenings to more than 2000 visitors on that particular day and through the week after. This was a role that was ably essayed by another group of learning sites, in which nature's bounty provides its own lessons. The managers of the World Heritage Sites of Great Himalayan National Park, Nanda Devi and Valley of Flowers National Park, Khangchendzonga National Park, Kaziranga National Park, Sundarbans National Park and Kudremukh National Park (Western Ghats) stepped up to reach out to tourists, school children and local communities on the occasion of World Heritage Day, helping them realise the special value that such places hold.

Taking the message of natural heritage to an even larger space, that of a young mind's imagination, WII-C2C with the extensive support of NMNH also organised an India-wide Art Contest on the theme "Saving India's Natural Heritage".

The response was incredible as even in this age of digital communication, schools from Arunachal Pradesh to Goa and from Kashmir to Kanyakumari organised painting sessions to let students express themselves in colours on paper. The entries that came into the NMNH office in New Delhi via post spoke volumes of the creative talent in our school students and of their innate connection with nature. As demonstrated perfectly by the 1st Prize winning entry seen overleaf, a watercolour by Ms. Nayonika Jena, a Class 12 student from Bhubaneswar, natural heritage conservation requires the unification between the cultural, natural and intangible domains. This underlying thought was also in evidence in the many ways that World Heritage Day 2024 was celebrated across campuses, wildernesses and minds.

About the Author:

Anuranjan Roy is a World Heritage Assistant at the WII-Category 2 Centre. He has visited and studied 38 World Heritage Sites spread across 5 countries. He co-edited "Wild Treasures", an anthology published by WII-C2C which spans 200 years of writing about 16 natural World Heritage Sites across the Asia Pacific.

The World Heritage Students taking the 'World Heritage Day 2024 Pledge' in Goae

First Prize Winner in World Heritage Day Art Contest (by Ms. Nayonika Jena)

Celebration of World Heritage Day with local community at Valley of Flowers National

NATURE DETECTIVES :

Little Scientists exploring Ganga in scorching summers

NMCG-WII project orchestrated the 2024 Summer Camp launched on May 27 with great aplomb engaging more than 500 students in an array of activities. This event was convened for students from various government, private, and Bal Ganga Prahari schools, along with underprivileged children from the Ganga basin states. The camp showcased an eclectic array of captivating activities designed to cultivate environmental awareness among the attendees. Students engaged in several Ganga theme-based activities such as creating craft out of diverse animal species from the Ganga River using origami, fun activities based on Ganga aqualife conservation, tug-of-war game depicting the struggle between terrestrial and aquatic creatures, puppet shows and fauna-themed bingo. A few more highlights included dance performances, rhythmically accompanied rhyme recitations, and storytelling sessions imbued with inspiration, erudition, and camaraderie.

The children's imagination and fervour were vividly manifested in their intricate creations, with each fold of paper narrating a distinctive tale. The impact of the camp extended beyond mere activities; it nurtured a sense of responsibility and stewardship for the environment. By blending education with entertainment, the 2024 Summer Camp at WII not only enriched the participants' knowledge but also inspired them to become ambassadors for environmental conservation. It reinforced the Wildlife Institute of India's commit ment to fostering a generation that values and protects our natural heritage, ensuring a sustainable future for generations to come.

EMPOWERING FISHERIES CONSERVATION:

Insights from WII's National-level Workshop

A comprehensive national-level training workshop entitled "Harmonising Sustainable Fisheries for Freshwater Biodiversity Conservation" was organised at the Wildlife Institute of India, Dehradun, Uttarakhand from June 11th to 13th, 2024 under the National Mission on Clean Ganga (NMCG). A cohort of 39 participants from the fisheries departments of 10 different Ganga River Basin states gained invaluable insights and practical knowledge on harmonizing sustainable fisheries practices to enhance freshwater biodiversity conservation. They assimilated strategies and approaches to manage fisheries effectively while preserving the ecological integrity of the Ganga River Basin, thereby contributing to the long-term sustainability and biodiversity conservation efforts in the region.

The workshop consisted of lectures, interactive hands-on sessions, group activities, and field visits fostering deep discussions and information exchange. A solid foundation for the future was established through the thorough exploration of topics such as aquatic species conservation techniques, comprehensive river assessment frameworks, and the ecosystem services provided by the Ganga River and its tributaries.

By engaging in vibrant group activities and discussions, the programme cultivated a sense of collaboration and camaraderie extending beyond the confines of lecture rooms. In addition to enhancing their understanding, this synergy among participants set the stage for potential future partnerships in freshwater biodiversity conservation. These experiences reaffirmed the participants' dedication to preserving the Ganga River's invaluable ecosystems for future generations while underscoring the river's profound significance.

‘WILDLIFE PROTECTION, LAW AND FORENSIC SCIENCE’

for Officer Trainees of 75th Batch of Indian Revenue Service (Customs & Indirect Taxes) Group-A (NACIN, Palasamudram)

Course Director: Dr. SK Gupta
Asst. Course Director: Dr. Samrat Mondol

The course was for two weeks: 08th to 20th April 2024. A total of 42 personnel participated in the course. The course was concluded with a field visit to Corbett National Park from 17th to 20th April 2024.

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

Two-Week Special Course in Wildlife Protection, Law ad Forensic Science'for the 75th Batch Officer Trainees of Indian Revenue Service (Customs and Indirect Taxes) Group-‘A’
08 to 19 April 2024

Sitting Row :- Ms. Muskan Khurana, Ms. Apurva Rastogi, Ms. Pooja Barwal, Ms. Riju Shrivastava, Dr. Ashish Jha, Dr. S.K. Gupta, Dr. Ruchi Badola, Sh. Ved Prakash Shukla, Sh. Virendra R. Tiwari, Dr. S. Sathyakumar, Dr. Samrat Mondal, Dr. Bilal Habib, Dr. Gautam Talukdar, Ms. Zufishan Haque, Ms. Nidhi Pai, Ms. Niranjana M., Ms. Sathya Parvathy, Ms. Navkiran Kaur,

Standing Row 1 :- Ms. Ayushi Kalwar, Mr. Abhinav Khadelwal, Mr. Mukund Kumar, Ms. Damini Diwakar, Ms. Sangay Eden, Mr. Satish Shrishail Somjal, Mr. Udham Patel, Mr. Paras Garg, Mr. Abhishek Maji, Mr. Deepak Dangi, Ms. Khushboo Oberoi, Ms. Zangmo, Mrs. Anuradha, Ms. Ugyen Pemo, Ms. Dia Dutta, Mr. Sivaprakash S.V., Ms. Tanvi Bamnawat, Mr. Shrey Dandriyal, Mr. Madhanraj,

Standing Row 2 :- Mr. Shivhar More, Mr. Rahul, Mr. Ankit, Mr. Ishan Ajit Tipnis, Mr. Ram Shankar Meena, Mr. Afnan Abdu Samed, Mr. Mohammed Siddiq Shariff, Mr. Abhinav Jain, Mr. Pandu Wilson, Mr. Tarun Bansal, Mr. Rahul Agrawal, Mr. Shantanu Malani, Mr. Jigme Wangchuk, Mr. Phub Tshering, Mr. Kachhawa Roshan Kevalsing, Dr. Vikram Delu,

Facilitation of the Sh. Ved Prakash Shukla, Pr. ADG, NACIN, Lucknow (Chief Guest of the inauguration function)

‘WILDLIFE CONSERVATION, IDENTIFICATION OF WILD-LIFE PART AND FORENSIC INVESTIGATION’

for the Trainee Inspectors of Customs and Indirect Taxes, NACIN, Jaipur

(20th & 21st May 2024)

Course Director: Dr. SK Gupta
Asst. Course Director: Dr. Samrat Mondol

Number of Participants: 47

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

Two-day Special Course in Wildlife Protection, Law and Forensic Science for the Trainees Inspectors of Customs and Indirect Taxes of Rajasthan Zone
20th to 21st May 2024

Sitting Row :- Ms. Nidhi Agrawal, Dr. Manohar Pathak, Sh. Rajneesh Sharma, Dr. Ritesh Gautam, Sh. Prashant Mahajan, Dr. Salvador Lyngdoh, Dr. Parag Nigam, Dr. B.S. Adhikar, Sh. A.K. Meena, Dr. S. Sathyakumar, Dr. S.K. Gupta, Sh. Manoj Nalwaia, Sh. Chunni Lal, Ms. Kamini Goyal, Ms. Sonika, Ms. Mahak Jotwani, Ms. Nidhi Agrawal, Ms. Kalpana,

Standing Row 1 :- Sh. Ashish Choudhary, Sh. Vishal Malik, Sh. Sparsh, Sh. Shubham Chauhan, Sh. Ajay Saini, Sh. Kaushal Singh, Sh. Dehul Parashar, Sh. Piyush Kumar, Sh. Pradeep Kumar Bairwa, Sh. Sarthak Dixit, Sh. Yash Jain, Sh. Mukesh Kumar Rulania, Sh. Manjeet, Sh. Pritam Manju, Sh. Ujjwal Verma, Sh. Rahul Verma, Sh. Hemant Godara, Sh. Paras Pathak, Sh. Rajesh Kumar Suthar, Sh. Ayush Garg, Sh. Sandeep Saini, Sh. Sunil Suiwal,

Standing Row 2 :- Sh. Rajat Singh, Sh. Amit Srivastav, Sh. Vikas Kumar Shukla, Sh. Jonty Nandal, Sh. Ajaypal Sinwar, Sh. Vikram Singh, Sh. Ankit Kumar Agarwal, Sh. Ravinder Sen, Sh. Kailash Chand Saini, Sh. Anshuman Tak, Sh. Kaushal, Sh. Ajeet Kumar, Sh. Bharat Kumar Meena, Sh. Ramawatar Meena, Sh. Mohit Sharma, Sh. Ajeet Kumar,

EMPOWERING ZOO KEEPERS :

A Transformative Training Workshop at GB Pant High Altitude Nainital Zoo

Zoo keepers and frontline forest staff are essential participants in the Ganga biodiversity conservation due to their direct interaction with wildlife, expertise in emergency response, and extensive local knowledge. Their role as first responders to animal emergencies in the Ganga River makes their training crucial for effective rescue operations. Additionally, their responsibilities in habitat management, public education, and continuous monitoring of wildlife health make them vital for implementing and advocating conservation strategies. Their involvement ensures that conservation efforts are practically applied, leading to effective outcomes and enhanced coordination with other agencies.

Anticipating the importance of zoo keepers and frontline forest staff, NMCG-WII conducted a two-day training workshop titled "Ganga Biodiversity Conservation" at the auditorium of Pt. Govind Ballabh Pant high altitude Nainital Zoo with 52 Zoo keepers and frontline forest staff, all eager to enhance their skills and knowledge in biodiversity conservation and animal care.

Participants gained invaluable expertise in managing diverse species, promoting animal welfare, and ensuring safety protocols. The program's holistic approach included hands-on activities that allowed participants to apply their newfound knowledge in simulated scenarios. Topics such as nutrition management, veterinary care, and conservation breeding strategies were explored in depth, equipping attendees with comprehensive insights into zoo operations. Throughout the workshop, the dedication and enthusiasm of the participants were palpable, reflecting their commitment to advancing animal care standards and biodiversity conservation efforts. Their active engagement underscored the workshop's success in bridging theoretical learning with practical application.

CELEBRATING NATURE'S PLAYGROUND :

WII-NMCG's Vibrant World Environment Day Festivities

WII-NMCG celebrated World Environment Day on June 5th, 2024, amidst great enthusiasm and participation from school children representing various educational institutions. Engaging school children in World Environment Day instils a sense of responsibility and environmental stewardship in young minds. By involving them in interactive and educational events, we can nurture a generation that is more conscious of, and committed to protecting the environment. Such celebrations provide a practical learning experience beyond the traditional classroom setting. The hands-on activities and real-world applications of environmental concepts make the learning process more dynamic and impactful.

The festivities unfolded with a series of engaging activities, each meticulously designed to educate and entertain. An environmental quiz tested the children's knowledge and sparked discussions on various environmental topics, enhancing their awareness of global and local ecological issues. The Ganga Safari Bingo, a creative and interactive game, helped the students learn about the diverse species inhabiting the Ganga River and its surrounding ecosystem. This activity was not only fun but also educational, providing insights into the rich biodiversity of the region.

One of the highlights of the day was the exhilarating tug of war, themed around aquatic versus terrestrial species. This event was more than just a physical challenge; it symbolized the interconnectedness and the balance between different ecosystems. Through this activity, children learned about the coexistence of species and the importance of maintaining ecological balance. The winners were rewarded for their achievements, while sincere appreciation was conveyed to every student for their spirited involvement.

A Bengal monitor lizard *(Varanus bengalensis)* prowling around the Lake vegetation

A SUCCESSFUL BREEDING SEASON FOR SNAKEHEADS IN THE WILDLIFE INSTITUTE OF INDIA'S LAKE

- Saurav Das

It gives me immense joy to spend time on the nature trail at the Wildlife Institute of India. Walking down the path always mesmerizes me with its beauty and never before had I looked at birds, butterflies, insects, plants, and other species with so much love, simply for being themselves. It is, by far, the most precious gift I have ever received from the Institute. This small area, largely undisturbed by human activities and harboring great biodiversity, always makes me think about how we are threatening wildlife by destroying habitats.

Recently, I have been observing the Lake within the Institute's premises. This quintessential aquatic ecosystem had been waiting long for rains and, eventually, received its blessing by the end of June. Drop after drop turned into torrential rains and within a week, the Lake got a new lease of life. The Lake nurtures a variety of flora and fauna across distinct trophic levels. Various birds forage in and around the Lake, including the Common Kingfisher (*Alcedo atthis*), Stork-billed Kingfisher (*Pelargopsis capensis*), White-throated Kingfisher (*Halcyon smyrnensis*), White-breasted Waterhen (*Amaurornis phoenicurus*), Indian Spot-billed Duck (*Anas poecilorhyncha*), Red-wattled Lapwing (*Vanellus indicus*), Indian Pond-Heron (*Ardeola grayii*), Little Egret (*Egretta garzetta*) etc. The area also includes many reptiles and amphibians, such as the Tricarinate hill turtle (*Melanochelys tricarinata*), Indian black turtle (*Melanochelys trijuga*), Chequered Keelback (*Fowlea piscator*), Oriental Ratsnake (*Ptyas mucosa*), Indian bullfrog (*Hoplobatrachus tigerinus*), Bengal monitor lizard (*Varanus bengalensis*) etc.

The arrival of the rains brought joy to many, but none were more delighted than the fishes, especially the Striped snakehead (*Channa striata*). They might have been in aestivation for a few months, a process in which they burrow into the mud, create a mucus-lined chamber, and subsist on stored fat. With the increase in water level, all the snakeheads started to move towards the shallows – I noticed a particular spot where a stream is connected to the Lake, and the depth is only 6-10 cm. But why? Was there a cue? Snakeheads are predatory; they feed on fish, frogs, insects, earthworms, freshwater crustaceans, and tadpoles. As a dietary generalist,

they can feed on any available food. Hence, I wondered if they might have moved towards the shallows for better feeding opportunities. However, I found that they were there for something more than just food.

It was the beginning of July that I first observed this sudden behavioral change in them. They were splashing water, which caught my sight from a distance and my curious mind led me to investigate. As I moved closer to the site, they sensed my presence and started moving to deeper waters. "Okay! I should be more careful", I thought. The next day, I moved closer to them, step-by-step this time. I was vigilant while approaching them, not wanting to scatter them away like last time, and observed two snakeheads in a small pit surrounded by shrubs. "Oh, wow", I exclaimed! They were preparing to welcome their next generation, busy in copulation. I also noticed a bunch of them that appeared aggressive in their behavior. It seemed like the remaining ones were also in search of mates, and an inconspicuous tussle had begun.

I scoured through scientific literature to know more about this reproductive behaviour and here is what I found: snakeheads are solitary, and exhibit monogamous behaviour throughout the reproductive season. The mating behaviour of this species was studied in captivity by Paray et al. (2013), but no studies have been conducted in the wild. To study their reproductive behaviour, hormones (pituitary extract HCG) were injected into the fish. Two males and one female were kept in a single fish tank.
One of the males, found to be more active, moved below the female, facing the opposite direction, which led to the pair making slow upward and downward motions.

The study also found that males also engage in courtship behaviour. They do this by frequently hitting the snout and vent of the female while gametes are being released.

I observed them for some days before the monsoon arrived in its full glory by the first week of July. Eventually, heavy rains increased the water level, making the Lake inaccessible. Their successful breeding was confirmed when I observed groups of hatchlings guarded by particular pairs. Although I still have a lot of questions about the snakehead's reproductive behavioural patterns, I felt a sense of happiness and satisfaction at observing their new generation successfully habiting the Lake's space.

About the Author:

Saurav is currently working as Project Associate-I in the project IDWH-Caracal since April 2024. Previously he worked as a Project Associate-I in the All India Tiger Estimation project (genetic component) during January 2023 to March 2024. His research interest includes addressing ecological and evolutionary questions using molecular genetics. Apart from research, whenever schedule permits, he enjoys traveling solo.
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A red-wattled lapwing *(Vanellus indicus)* at the bank of the Institute's lake

Group of snakehead hatchling *(Channa striata)* foraging at the surface

EARTH DAY 2024 :
Planet Vs. Plastic

The 2024 Earth Day celebrations were distinguished by a series of impactful events organized by the National Mission for Clean Ganga (NMCG) at Wildlife Institute of India (WII), along with various schools. These events focused on raising awareness about plastic pollution and promoting sustainable practices. On April 22nd and 23rd, the NMCG WII campus buzzed with activity, hosting a vibrant Earth Day event. Participants included 32 students and 2 teachers from GIC Patel Nagar, as well as 250 students and 10 teachers from St. Patrick's Academy, who held a skit competition themed "Planet vs. Plastics".

In Varanasi, an awareness campaign engaged 72 students and 4 teachers from Chetan Balika Inter College, effectively educating them on the significance of Earth Day and the broader environmental issues at hand. Approximately 80 stakeholders from the Social Development for Community (SDC) Foundation joined 360 youngsters and 20 instructors from various schools to participate in Earth Day activities. In an effort to further spread the message, a blog post titled "Planet vs. Plastic" was published on Ganga Darpan, urging readers to adopt sustainable practices by examining the global plastic crisis, its severe impacts, and potential solutions.

During this period, a total of 6 awareness programs, 4 cleanliness drives, and 2 plantation drives were conducted across several locations, including Chamoli, Bijnor, Bulandshahr, Pilibhit, Prayagraj, Varanasi, and Sahibganj. These activities showcased a widespread commitment to environmental conservation. Additionally, in collaboration with the Social Development for Community Foundation, a plastic collection drive was launched at the WII campus. Participants were encouraged to bring at least 22 pieces of single-use plastics, highlighting the critical role of community involvement in reducing plastic waste.

These Earth Day activities collectively emphasized the importance of environmental stewardship and inspired participants to engage in sustainable practices. They demonstrated a unified stand against plastic pollution, reflecting a collective commitment to preserving the environment for future generations.

ST. PATRICK'S ACADEMY TAKES CENTRE STAGE :

Inspiring Action Against Plastic Pollution

On April 23rd 2024, St. Patrick's Academy echoed with creativity and passion as it hosted a compelling skit competition in honour of Earth Day. The event brought together a total of 250 students and 10 dedicated teachers, all united in their commitment to tackling one of the planet's most pressing challenges: plastic pollution. The competition theme "Planet vs. Plastics" served as a poignant reminder of the detrimental impact of plastic on our environment.

Through a series of thought-provoking skits, the participants skilfully portrayed various aspects of this global issue, highlighting its far-reaching consequences and urging persuasive action. The event commenced with an electrifying atmosphere as each team shook the stage with unique interpretations and messages. The skits underscored the school dedication to fostering awareness, and advocacy among its students and staff as they showcased innovative solutions to reduce plastic waste, promote recycling initiatives, and encourage sustainable lifestyles.

Awards were presented not only for outstanding performances but also for their depth of understanding and sincerity in promoting environmental stewardship. The event concluded on a high note with a renewed sense of purpose and determination among the participants. As they left the auditorium, discussions continued about how each individual can play a role in combating plastic pollution and safeguarding our planet for future generations. To quote one of the participating teachers, "This competition was not just about showcasing talent; it was about igniting a passion for environmental conservation. The students' creativity and dedication have shown us that, together we can make a difference.".

FEEDING THE PROBLEM :
How Provisioning Fuels Man-Monkey Conflict in Delhi

- Mukesh Chand, Parvaiz Yousuf

Macaques are one of the wisest primates who have learned to live alongside humans. In major cities of India like Delhi, encounters with macaques are a common sight. For instance in 2018, municipal bodies estimated that up to 40,000 monkeys are living in Delhi, most of which used to and continue to coexist with humans in the busy streets of the city. The havoc they cause is hidden from none. From damaging the property to injuring humans, Rhesus macaques have been blamed. However, the problem is not one-sided, or it's not only the monkeys that are on the wrong here. We humans are to be equally blamed. Here, we try delving into how thousands of monkeys were caught and shifted to the sole Wildlife Sanctuary in Delhi - the Asola-Bhatti Wildlife Sanctuary (ABWS).

The Backstory

Once the Government of the National Capital Territory (NCT) of Delhi decided to capture macaques from the busy streets of Delhi, they began disappearing from certain areas like Chandni Chowk. However, in another part of Delhi, in and around the AWBS, the number of macaques started to rise. People living in and around ABWLS began encountering more and more macaques (Figure 1).

"Before the COVID lockdown, we used to walk in the jungle, taking leftover food like chapati, rice, or any other food to feed the monkeys, which were very less in number", says a woman from Sangam Vihar in Tughlaqabad, New Delhi. Since the number was low, the macaques would receive enough food in the forest and did not need to come out of the Sanctuary. However, the biggest challenge was not to relocate the macaques to Asola, but to restrict or contain them within the boundaries of ABWS. But before coming to that point, let's try understanding how macaques and humans have come to the present situation.

Figure 1: Rhesus Macaque holding a stolen Parle-g biscuit.

A Shared History: From Coexistence to Conflict

Rhesus macaques (or rhesus monkeys) have evolved alongside humans. Historically, they coexisted peacefully with us. However, as our needs grew, we encroached upon and destroyed natural habitats, converting them into residential areas, agricultural fields, and industries. This Anthropocene era has been challenging for many species, but some, like the Rhesus macaques, survived through their excellent adaptability and high cognitive ability.

Rhesus macaques have shown remarkable resilience, easily surviving and breeding in habitats disturbed and modified by human activities. In a bustling city like Delhi, the capital of India, it is hard for humans to survive, let alone wildlife. Yet, Rhesus macaques have adapted well to this human-dominated landscape. Their population has increased over the last few decades as they lost their erstwhile natural habitat. With the disappearance of their habitats, macaques found little natural food to survive. Consequently, they migrated towards agricultural fields, colonies, shops, houses, and garbage dumps in search of food. This food, more nutritious and readily available than their natural sources, provided them with a better breeding ground, leading to a rapid population increase.

Figure 2 & 3: Feeding Rhesus macaques at Asola-Bhatti Wildlife Sanctuary

This population surge and quest for food made their presence unavoidable amongst human communities. The alarming rise in the macaques' population and an increase in monkey bites and raids on government buildings and residential neighbourhoods developed a sense of stress, fear, and bitterness between humans and macaques. This heightened conflict soon led to public outcry, demanding solutions.

Increase in Conflict and Judicial Intervention

In 2007, in response to a PIL, the Delhi High Court banned feeding monkeys in public areas and instructed municipal authorities to fine those who violated the ban. The Court also directed the Government to remove monkeys from urban areas and translocate them to the forest of Asola-Bhatti Wildlife Sanctuary on the Delhi-Haryana border. An expert committee was also set up to explore the option of population control through the sterilisation of macaques in the Sanctuary.

Over 15 years have passed since the HC Order, and authorities have translocated some 20,000 monkeys to the Sanctuary. According to the Asola-Bhatti Wildlife Sanctuary Management Plan (2015-2024), a total of 18,507 rhesus macaques had been translocated to the Sanctuary until January 2015. In the absence of natural predators, their population has increased significantly. The tropical thorn forest of the Sanctuary cannot meet the natural food requirements of these primates. However, the biggest challenge was to keep these intelligent primates restricted within the boundaries of ABWS.

Feeding the Monkeys or Feeding Conflict?

Since Asola-Bhatti is a Prosopis-dominated forest, there is no significant natural food available for monkeys. Moreover, it's very difficult for such a small area to accommodate such a large number of macaques along with thousands of other herbivores and carnivores. The Government, which had earlier banned people from feeding monkeys, has now resorted to the same activity, albeit from a sense of compassion. The Government decided to feed the monkeys in ABWS and over 18 feeding points were created in the Sanctuary (Figures 2 & 3).

The Government is spending a staggering amount of around ₹1 crore annually to feed monkeys which equals to around 8 lakh rupees per month (Figure 2). The feeding of monkeys in Delhi is surely a short-term solution, unscientific and unsustainable. Rather than solving the problem, the Government is worsening the situation. The monkeys have more than sufficient food resources and are reproducing in huge numbers, close to their carrying capacity. The day the government stops feeding the monkeys, we can imagine what will happen to the national capital of Delhi. However, not all the monkeys are restricted to the ABWS. Since macaques are territorial, there is huge competition for these 18 feeding points. A large number of macaques still come to the settlements around ABWS and cause havoc. Moreover, we observed people still feeding a large population of macaques on a road connecting Delhi and Haryana, which should not be done. Although sign boards indicate a fine for feeding monkeys, these rules and laws fall under the rubble. Due to religious reasons, the practice of feeding macaques goes unnoticed (Figure 4).

What Do People Think About It?

We conducted field surveys from April to June 2024 in the periphery of Asola-Bhatti Wildlife Sanctuary, including 200 household interviews.

Figure 4: Provisioning and warning board outside sanctuary gate to not feed rhesus macaques.

The survey addressed two questions: 1) Has the number of monkeys increased in the area, and if yes, are they coming from the Sanctuary or elsewhere? 2) Were the people aware of any provisioning activity carried out by the State Forest Department inside the Sanctuary? (Figure 5)

About 78.4% said house-raiding macaques have increased in the last five years. Of these, 62.5 % observed macaques coming from the Sanctuary periphery and 10 % from nearby markets. On the second question, 86.3% were unaware of any provisioning inside the Sanctuary as they had never visited the core areas where the feeding stations have been established. About 13 % were aware of provisioning, with 7 % knowing due to their working as daily wage labourers inside the sanctuary (Table 1).

The Broader Impact: Ecological and Social Ramifications

Provisioning affects more than just the immediate behaviour of the macaques. Studies suggest it can alter their foraging patterns, social interactions, and habitat use, ultimately impacting the broader ecosystem.

For example, macaques that rely on human-provided food may not disperse seeds effectively, disrupting the natural regeneration of the forest. Additionally, the frequent aggressive interactions between humans and macaques can escalate, leading to serious injuries on both sides.

Studies conducted in the Sanctuary suggest that despite daily feeding, many macaque groups move outside the Sanctuary boundaries in search of food. Dominant groups often monopolise feeding centres, preventing other groups from feeding. Additionally, the protection afforded within the Sanctuary has turned it into a safe breeding ground, with the population perhaps close to or exceeding its carrying capacity, leading to severe conflicts with surrounding human communities.

Although Schedule II of the Wild Life (Protection) Act ensures the protection of wild species, in December 2022, the Union Government removed Rhesus macaque from the same, stripping them of protection from hunting.

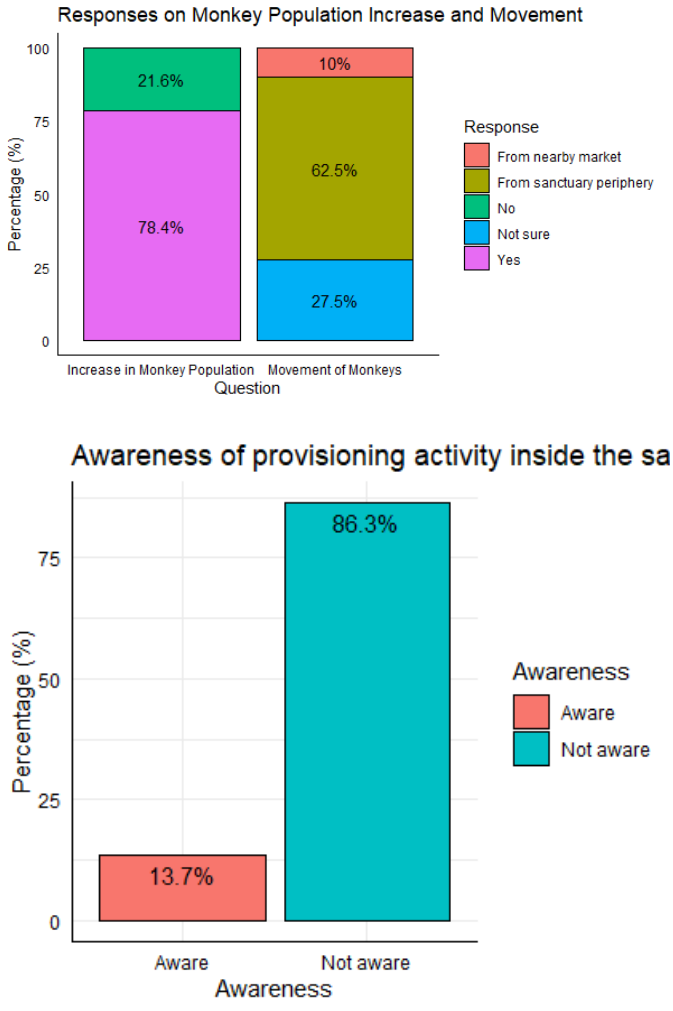

Figure 5: Graphical representation of Survey results

Conclusion

The relationship between humans and macaques in urban areas like Delhi is complex and challenging. The measures taken so far, including the translocation of monkeys to the Sanctuary and the provisioning of food, have not provided a sustainable solution. The population of macaques continues to grow, and conflicts with humans are rising.

Sustainable management must go beyond immediate fixes, focusing instead on restoring and enhancing natural habitats, promoting coexistence, and implementing ongoing population control measures like sterilisation (easier said than done, and efficacy needs testing & field trials). These efforts, combined with public awareness campaigns about the consequences of feeding wildlife and the importance of maintaining a safe distance from these animals could help reduce direct human-primate interactions.

The challenge of living alongside macaques in urban environments is not unique to Delhi; it is a global issue that requires innovative and humane solutions. By understanding the root causes of the conflict and addressing them through science-based management practices, we can hope to create a future where humans and macaques coexist peacefully. This will benefit the macaques and enhance the quality of life for people living in affected areas.

About the Authors:

Mukesh Chand is a researcher at the Wildlife Institute of India. He holds an M.Sc. in Environmental Science and works as a Project Associate in the project "Developing an Integrated Management Plan for Asola-Bhatti Wildlife Sanctuary, New Delhi". His interest lies in understanding the emerging conflict between humans and non-human primates.
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Parvaiz Yousuf is a prolific writer and researcher at the Wildlife Institute of India. He holds an M.Sc. in Zoology with a keen interest in Ornithology. He recently authored the well-received book "Birds of Jammu & Kashmir Including Ladakh" and has numerous publications in prestigious journals. He contributes to international science magazines like Asian Scientist and Truly Curious, and served as the Director of the Wetland Research Centre Wildlife Conservation Fund YPJK during 2018-2023.
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	Question	Response	Percentage (%)	Number of Households (n)
1.	Has the number of monkeys increased in the area in the last five years?	Yes	78.4	157
		No	21.6	43
2.	If yes, are they coming out of the sanctuary or from somewhere else?	From sanctuaryperiphery	62.5	98
		From nearby market	10	16
		Not sure	27.5	43
3.	Are you aware of any provisioning activity happening inside the sanctuary?	Not aware	86.3	173
		Aware	13.7	27
4.	If aware, the reason for awareness (working as daily wage labour inside the sanctuary)	Daily wage worker at the sanctuary	7	14
		From newspaper	6.7	13

Table. 1: Household survey for human-macaque conflict.

IN CONVERSATION WITH DR. ASAD R. RAHMANI

Dr. Asad R. Rahmani is a distinguished Indian ornithologist and conservationist, renowned for his passion towards protecting India's natural heritage. With a career spanning over four decades, he has made significant contributions to the field of wildlife conservation, particularly in the areas of bird ecology, grassland, and wetland conservation. Dr. Rahmani served as the Director of the reputed Bombay Natural History Society (BNHS), Mumbai from 1997 to 2015, where he played a pivotal role in advocating for the protection of critical habitats and endangered species. Post-retirement, he currently holds a Scientific Consultant position to The Corbett Foundation and Hem Chandra Mahindra Trust.

He has also served as a member of various national and international conservation bodies, including the IUCN and the Wildlife Institute of India. A prolific writer and researcher, Dr. Rahmani has authored more than 100 scientific papers, 26 books and over 300 popular articles on conservation issues, and has received several awards for his tireless efforts to protect India's biodiversity. Through his leadership and dedication, Dr. Rahmani has inspired a generation of conservationists and has made a lasting impact on the field of ornithology and wildlife conservation in India. In this interview, we talk to Dr. Rahmani about his life's work, his views on conservation, and his advice for the next generation of conservationists.

Dr. Rahmani studying bird skins in the BNHS Museum, Mumbai in January 2023
(**Photograph:** Omkar Adhikari)

1. Could you briefly tell us about your childhood in general, and any particular experience that left you in awe of nature and/or wildlife?

Response: My father was a District Judge, and every 3-4 years, he would be transferred to a new town in Uttar Pradesh. I got to see many towns like Bijnor, Meerut, Tehri Garhwal, Saharanpur, Rampur, Badaun, Agra, and others in the late 1950s to early 1970s. We used to live in large, colonial-era houses with big lawns and trees. Some of these houses, like the ones in Rampur and Badaun, were on the edge of towns, allowing me to explore the countryside. This sparked my interest in nature! I was fascinated by animals of all kinds, and in my childhood, I kept nearly 25 pets, including unusual ones like a hedgehog and a goral (besides the usual ones like dogs, cats, pigeons, lovebirds, rose-ringed parakeets, chickens, and ducks). Please remember this was before the Wild Life (Protection) Act came into being in 1972, and during my childhood and teenage days.

2. What initially drew you to the field of ecology and conservation? Please also tell us briefly about your educational background and professional journey?

Response: I was always interested in life sciences, despite my father's initial desire for me to become an engineer. I revolted, lost one year, yet pursued biology, topping my district in the process!
My father used to subscribe to *The Statesman*, *Times of India* and many local newspapers and magazines. Even without knowing much English – my schooling was in Hindi-medium – I started reading M. Krishnan's fortnightly column, 'Country Notebook', published in *The Statesman*, and would dream to see the wild animals and places that he would write about. He had the greatest influence on me, much before I heard the name of Dr. Sálim Ali or the Bombay Natural History Society (BNHS). Jim Corbett's books were present in any family's house in north India, which I duly read over and over. Another book that helped me make up my mind to become a naturalist was E.P. Gee's *The Wildlife of India*. The indomitable Khushwant Singh was also interested in nature, and regularly brought about special wildlife editions of *The Illustrated Weekly of India*, with colour pictures of animals.

I did my BSc from R.B.S. College, Agra, and MSc (Zoology) from Aligarh Muslim University (AMU). I wanted to work under Dr. Sálim Ali, but since BNHS did not have any scholarship during those days, I ended up doing my PhD on the olfactory organs of fishes from AMU. From early 1970s, I got in touch with Mr JC Daniel and BNHS, and would regularly send my articles to him and Dr. Sálim Ali. I eventually joined BNHS in 1980, just after my PhD, in the Bird Migration Project, and later shifted to the Endangered Species Project, working on the Great Indian Bustard and floricans.

3. Were there any mentors or people who made a significant impact on who you are today and everything you have achieved? What are some key lessons you learned from them?

Response: I was fortunate to have some wonderful teachers in school and college, like Mr. Varma, who taught us zoology and Dr. Bannerjee, who taught us botany in BSc. They instilled a love in me for biology, and I hardly ever missed any of their classes. Similarly, I had wonderful teachers in AMU – unfortunately most of them have left us, but their teachings still reverberate in my mind. As mentioned in the earlier response, M. Krishnan, Dr. Sálim Ali, and Mr. JC Daniel had profound impacts on me. Mr. JC Daniel was my mentor and boss at BNHS for 12 years during 1980-1991, and later my colleague when I rejoined BNHS (I was at AMU in the interim) in 1997 as its Director. I owe everything to Mr. Daniel, Dr. Sálim Ali and BNHS. I learned the importance of passion, commitment, and spreading knowledge from all my mentors.

4. Can you describe your journey into this field? How did you land on grassland and wetland birds from working on fishes for your PhD?

Response: I was always interested in wide-open arcadian spaces – in childhood my main recreation was to get lost in open fields (with my two pet dogs), enjoy the swirling clouds of the monsoon, see the aerial turning and twisting of flocks of birds, and smell the soil after the first rains (petrichor is the word for this). I was a typical philocalist – finding beauty in every thing, even in the industrious harvester ants, or the Argiope spider's web. Hence, when Mr. Daniel asked me to work on the Great Indian Bustard, I jumped at the opportunity as it allowed me to explore grasslands and open natural ecosystems. I also believe that no one can remain un-fascinated by wetlands, and so I was smitten too!

Throughout my life, I've embraced a maverick spirit – from my atheist beliefs and liberal political leanings to my advocacy for social justice and gender equality. I'd say that this unconventional approach extends to my conservation work as well. Instead of focusing on charismatic megafauna, I believe we should also prioritise lesser-known species and habitats. While forest conservation is crucial, we mustn't overlook the importance of preserving grasslands, wetlands, mudflats, rivers, and mangroves. Freshwater fishes, for instance, are often neglected, despite nearly 60% of India's native riverine and wetland fishes facing threats. Similarly, grassland-obligate species are in dire need of attention, but their pleas are falling on deaf ears. I've made it my mission to speak up for these overlooked species through my writings and lectures, and I continue to do so.

A much younger Dr. Rahmani (first from left) and his colleagues are seen ringing birds for ecological studies and absorbing first-hand learnings from the great Dr. Sálim Ali (second from right) at Keoladeo Ghana National Park in 1981 (**Photograph:** BNHS/special arrangement)

Dr. Rahmani amidst a typical Bengal Florican *(Houbaropsis bengalensis)* breeding habitat with colleague Rohit Jha at Shuklaphanta National Park, Nepal in 2015 (**Photograph:** Dhritiman Mukherjee)

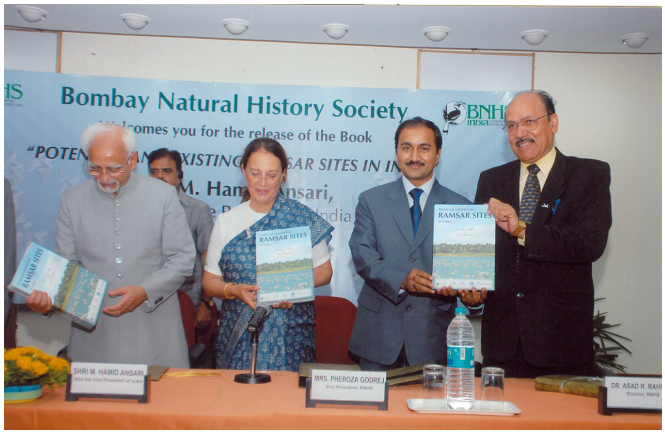
5. What are a couple of books or scientific/popular articles do you think that everyone in wildlife should read or know about?

Response: Answering this question is challenging, as there's no one-size-fits-all response. However, I'd like to stress that reading widely on various subjects is essential for researchers and conservationists. Some researchers may have in-depth knowledge of a narrow topic but lack broader understanding. I advise young students to 'Read, Read, and Read': First Read: Thoroughly read about your research topic to gain comprehensive knowledge. Second Read: Expand your reading to related subjects like geography, geology, culture, language, history, politics, economics, AI, and future predictions. This will help you understand the complexities of conservation and prepare you for the challenges ahead. There is little use publishing a paper in so-called '*high impact*' peer-reviewed journals on a threatened species when local community or decision-makers cannot understand it or access/learn from your findings. Third Read: Venture into totally unrelated subjects, such as poetry, novels, articles on gardening, cooking, or even movies. Explore the works of Tagore, Ghalib, Munshi Prem Chand, Agatha Christie, Shakespeare, Ian Fleming, Hawkins, Harari, Tamil/Marathi poetries and many more. This will broaden your perspective and foster creativity.

As the Latin phrase goes, '*Quot libros, quam breve tempus*' – 'So many books, so little time.' Embracing a wide range of reading materials will enrich your understanding and help you find innovative solutions to complex conservation issues.

6. Is there a favourite book or article that you co/authored which you think has had the most positive impact on on-ground conservation and feel very satisfied about?

Response: Two books come to mind – *Important Bird Areas of India* (2004) and its updated version in 2016, and *Threatened Birds of India* (2012). These books led to several state-wise mini *avatars*, for example, *Important Bird Areas of Sikkim* and *Threatened Birds of Uttarakhand*. These books resulted in several positive conservation actions at the state level. Another book – *Existing and Potential Ramsar Sites of India*, published in 2008 – highlighted 135 potential Ramsar sites, of which nearly 30 have been subsequently declared as Ramsar sites.



During 'Potential and Existing Ramsar Sites in India' book release function in 2008 with the then Vice-President of India Shri Hamid Ansari and other delegates
(**Photograph:** BNHS/special arrangement)

7. What are your views on the GIB Species Recovery Programme? Has it been on a successful track so far, and what do you think about the GIB's future or of other bustard species found in India?

Response: The Programme has perhaps begun 20 years late, but is progressing wonderfully well, thanks to the dedication of the young staff led by WII's Dr. Sutirtha Dutta with the full cooperation and support of the Rajasthan Forest Department and India's MoEF&CC. The GIB's future will be safe if the government protects and secures large landscapes like the Desert National Park, the grasslands of Naliya region and the Deccan.

8. Funding for species conservation programs in our country still primarily cater to large mammalian charismatic species. Do you think that's the right way to approach biodiversity conservation in India?

Response: While it's true that charismatic/glamorous species can generate funding for conservation, as conservationists, we must recognise the importance of every species and habitat. Some mega-vertebrates may serve as '*umbrella species*', but this should not overshadow other species. It's great to focus on the food habits of tigers, but what about the declining pollinators that provide us with food? Who is studying this critical topic and providing us with conservation action points?
I'm heartened to see the younger generation of researchers and conservationists working on a diverse range of species and habitats, including frogs, lizards, butterflies, dragonflies, cave animals, plants, mudflats, high-altitude wetlands, crabs, fish, pollinators, and more. May their efforts flourish and multiply.

9. You have spoken and written extensively about the interface of development and conservation. How do you think that the two can go together hand-in-hand sustainably and without compromising on our country's ecological security?

Response: It's a vast topic, but I believe that conservation of nature should be a mainstream and everyday issue concerning each responsible citizen of our country. As my hero M. Krishnan said, "...the identity of a country is dependent not so much on its mutable human culture as on its geomorphology, flora, and fauna – its *natural* basis." We need to find a balance between development and conservation, and this can be achieved through sustainable practices and eco-friendly policies.

10. An article about you highlighted the importance you give to women empowerment and education. Since we continue to live in a society that is largely patriarchal, what do you think that individuals and institutions could do in being more gender inclusive in the field of wildlife conservation, especially because a relatively small fraction of ecologists or conservationists today are women?

Response: As Marianne Williamson, an American author and speaker, aptly said, "*Yes, women are homemakers – and the entire earth is our home.*" I firmly believe in women's complete freedom and autonomy in all aspects of life. Empowering women strengthens and, in turn, empowers society, communities, and families.

Notably, some of the world's most exceptional conservationists are women. Who can forget the immense contributions to our field by Jane Goodall and Rachel Carson? In India, we have remarkable women conservationists like Anne Wright, Belinda Wright, Usha Ganguli-Lachungpa, Prerna Bindra, Dr. Vidya Athreya, and Dr. Aparajita Datta, to name just a few.

11. If you had the power to change or improve a particular system in the context of policy-making and conservation, what would you change and how?

Response: I would try to make conservation of nature a mainstream subject by educating decision-makers. This can be achieved through curricula changes in All-India and state-level officer training programmes, as well as deepening engagement with the political class at all levels. I would also like to see more involvement of local communities in conservation efforts and policy-making.

12. What overarching message would you give the current and upcoming generation of researchers and scientists on how to grow as conservationists or as good ecologists?

Response: Work with passion, commitment, and spread your knowledge widely in a language that people can understand. Read widely, think critically, and be prepared to challenge conventional thinking. Always keep in mind the importance of conservation and sustainability, and strive to make positive changes in yourself as well as strive for positive impacts in and around your living and workplaces.

Dr. Rahmani with BNHS's Parveen Shaikh (left) and WII's Dr. Bivash Pandav (right) at Sahson, U.P., National Chambal Sanctuary in 2022
(**Photograph:** BNHS/special arrangement)

Dr. Rahmani and colleague Dr. Raju Kasambe (back) with members of a tribal family living in Tadoba TR's buffer area in Maharashtra partly supported through BNHS's conservation initiative in 2012
(**Photograph:** Sujit Narwade)

GREAT INDIAN BUSTARD CONSERVATION BREEDING TAKES FLIGHT

- Shimontika Gupta

Five years ago, the Great Indian Bustard (GIB) was doomed to total extinction. The last 150 individuals were surviving without a safety net, largely in the dry and desolate Thar desert. Peril overshadowed hope for this magnificent species that was once a close contender to become India's national bird. Amidst such despair, the seed of conservation breeding was sown with great difficulties in an atmosphere of apprehension. At this juncture, a rollercoaster journey unfolded for the conservation team, endowed with the responsibility of germinating this seed.

The first Conservation Breeding Centre for GIB was hurriedly built in the summer of 2019, as a makeshift facility in Sam, 50 km west of Jaisalmer at the gateway of the vast Desert National Park. While the Centre was being constructed, egg collection for the founder population had already started. No one expected to find that many wild GIB nests in the first season, but the field team had learned to tell a nesting bird from its secretive behaviour, and on 20th June 2019, three eggs were collected for the program in the very first attempt. If that was not enough, within a day, hatched unannounced, numero 'Uno' - the first captive GIB chick.

Five years later, on 27th June 2024, the team watched 'L', the 50th chick (named after the Roman numeral), hatch from an egg laid by a captive female. These five years were marked by a steep learning curve, a lot of hard work, measured trial and error, patience, and faith, withstanding the heat and gusts of the desert. A major milestone was the initiation of captive breeding. Four females (all more than 4 years old) and one male (4 years old) have started mating naturally, producing 13 captive-bred chicks since March 2023. This journey provided a unique opportunity to learn about the breeding biology and behaviour of this rare critically endangered species that would never have been learnt otherwise.

Understanding female breeding behaviour has been both confusing and fulfilling, something barely studied in the wild because of their cryptic nature during the breeding season. Uno, the first captive-reared GIB and a female, started 'displaying' when she was one year old. At that time we blamed our 'parenthood' as female GIB were not known to display. The thought that we might have erred in sexing the bird also crossed our minds, as her testosterone levels were higher than a few males. Turns out, females too perform a display, similar to males. They cock their tails and vocalise (producing a softer guttural "*grr*" sound), with displays lasting a minute or two, sometimes triggered by the sight of another bird or a keeper. We believe it might be an expression of territoriality and an early sign of sexual maturity.

Image 1: 'Uno' the first captive chick that hatched in 2019 (left), and 'L' the 50th captive chick that hatched in 2024 (right)

The team had indulged in long hours of discussion about how to know when a female is ready to mate, since it is vital to time artificial insemination, with literature suggesting monitoring hormone levels and checking their cloaca. However, the deep imprinting and protracted habituation of captive birds to keepers made it a lot easier, because females sit down in front of keepers when they are ready to mate (some keepers preferred over others). The youngest female this was seen in was only 2 years of age. They become almost immobilised, with their head slightly lowered, tail quivering, and can be lifted and carried to a male for natural breeding. After mating, which can take around 20-40 minutes, the females jump up, ruffle their feathers and run back to their own cages. Both males and females take a few attempts before they successfully mate for the first time.

Egg laying starts earliest at the age of 3 years, usually with an infertile egg. All eggs are laid after dusk. Females have a preferred spot in their cage to lay and can be seen making a scrape on the ground before sitting down. Most females only incubate the egg till the next morning, usually stopping when activity in the Centre increases or it is their feeding time. The egg is then collected and artificially incubated. Females have already started laying multiple eggs in a breeding season, with one female, Toni (named after the famous writer Toni Morrison, whose passing on coincides with the bird's hatching), showing us the potential of a healthy bird, having laid up to 9 eggs in a year. Still, a lot more remains to be learned about their breeding management.

Before starting this project, the team had probably read every bustard husbandry and conservation breeding manual and had been trained by an expert team at the International Fund for Houbara Conservation. But no one imagined the depth of knowledge that would be gained while raising these first 50 birds in such close proximity. It has been crucial in developing the husbandry and management techniques for this species. Over the years, the team learned the birds' personalities, food preferences, breeding behaviour, and the nuances of each individual which then fed into how we care for them. Ensuring their welfare and weaving it with the scientific principles of captive management has translated into the success of this conservation breeding program so far. And these learnings have helped the species crawl out of total extinction. It now has a safety net and the hope of reviving its populations in the wild rises on the horizon.

Image 2: A male (right) and female (left) displaying at the Sam Conservation Breeding Centre

Author's note:
The Great Indian Bustard Conservation Breeding Program is a joint national initiative of the Ministry of Environment, Forest & Climate Change, Rajasthan Forest Department, Wildlife Institute of India - the implementing agency, and the International Fund for Houbara Conservation. The initiative is funded by the National CAMPA and is running since 2019. Following years of research and advocacy by field scientists and managers, the National Bustard Recovery Guidelines was prepared by the Government of India in 2013 and the decision to commence conservation breeding for insurance and future rewilding was taken by authorities in a national consultative workshop in 2014. It took an additional four years to garner funding, agreement, and approvals for this large and long-term initiative. The way forward for this program is to scale up captive breeding, train birds for release, and augment wild populations once habitats are restored across range states over a timeline of 10-15 years at least.

About the Authors:

Shimontika Gupta is a wildlife biologist interested in conservation science, animal behaviour and captive animal health and welfare. She is currently working as a Project Associate in the Bustard Recovery Program where she engages in a mix of in-situ, ex-situ and genetic work. She completed her post-graduate degree from the Royal Veterinary College and Zoological Society of London in 2021 and has been working closely with the bustards ever since.

Sutirtha Dutta is an ecologist, interested in population ecology, behavior and their conservation applications in multiple-use landscapes. For his PhD (Wildlife Sciences) and postdoctoral studies, he extensively studied bustards and associated fauna in Indian grasslands and deserts. His current work focuses on spatial prioritisation, risk characterisation, and conservation management with endangered bustards as the study model.

Image 3: Keepers with birds at the Ramdevra CBC (left) and Sam CBC (right)

GULF OF KACHCHH SHOREBIRDS :

Facing the Challenges of Coastal Pollution

- Praveen Kumar

According to the National Oceanic and Atmospheric Administration (NOAA), billions of pounds of trash and pollutants enter the ocean annually. While a substantial amount of trash is either submerged or concentrated in ocean gyres, the remainder is mistakenly consumed by marine animals as food, triggering a cascade of detrimental bio-physio-chemical impacts on the marine ecosystem, ultimately affecting human health as the final link in the food chain (Wilcox 2015). Additionally, millions of tons of debris wash up on beaches and mudflats, creating a "slum" for shorebirds and other waterbirds that rely on these areas for roosting, foraging, and breeding (Figure 1). Coastal marine pollution disproportionately affects low-income countries like India, where limited measures are in place to mitigate this issue (Legal Service India). Remarkably, even coastal areas with minimal human impact, such as the northern coastline of the Gulf of Kachchh (GOK) in Gujarat, are not immune to the scourge of marine pollution.

The northern coastline of GOK provides a vital habitat for tens of thousands of shorebirds and waterbirds year-round, with winter surveys (2020-22) conducted by the author revealing a significant surge in numbers during the winter months, as this coastline serves as a crucial wintering ground for migratory bird species. However, these birds face numerous threats, including habitat loss and degradation, exacerbated by marine pollution. Shorebirds rely on exposed coastal areas for roosting during high tide and mudflats/beaches for foraging during low tide. However, marine pollution, particularly plastic debris, is rendering these habitats unsafe for shorebirds and other waterbirds like flamingos. Entanglement and ingestion of plastic particles – mistaken for food – pose a significant threat to their survival (Figure 2). This alarming situation necessitates immediate attention to conserve and promptly clean up these critical habitats. Moreover, this issue of marine litter is likely a widespread problem along India's coastline,

Figure 1: Photograph showing small shorebirds roosting at a coastal site full of marine litter along the northern coastline of GOK, Gujarat.

underscoring the need for urgent action. Rather than attributing blame to individuals, we must recognize that the degradation of coastal habitats is a collective failure of humanity. Consequently, it is our shared responsibility to cooperate in protecting and conserving these vital ecosystems. The global community acknowledges the importance of preserving coastal ecosystems, and international agreements like UNCLOS (1982) mandate Coastal States to safeguard the marine environment. In India, legislation such as The Territorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976 and The Coast Guard Act, 1978 empowers authorities to take measures for marine environment protection and pollution control, highlighting the need for a unified approach to address this pressing issue.

The International Coastal Cleanup Day is an annual global event, observed in the third week of September, under the auspices of the United Nations Environment Programme (UNEP) and the South Asia Cooperative Environment Programme (SACEP), which coordinates the initiative in the South Asian region. The Indian Coast Guard (ICG) has been actively participating in and coordinating activities held during the International Coastal Cleanup (ICC) Day since

2006, supporting broader initiatives of the Government of India like the "Swachh Bharat Abhiyan" (Clean India Mission) and "Swachh Sagar Abhiyan." (Clean Sea Mission), inspired by the vision of the Hon'ble Prime Minister to promote mass cleanliness and sanitation.

The recent ICC-2023 event, conducted on September 16, 2023, highlights the need for increased frequency of such efforts to collaboratively address marine pollution. By acknowledging our shared responsibility and working together, we can mitigate the harmful effects of marine pollution and protect the vital habitats of shorebirds and other marine species. The time to act is now, and every small step counts in preserving the beauty and biodiversity of our coastal ecosystems for future generations.

About the Author:

Praveen is a PhD scholar at the Wildlife Institute of India. Praveen's research focuses on the wintering ecology of shorebirds along the Gulf of Kachchh coastline, exploring their habitat preferences, potential alternative habitats such as saltpans, and the availability of food resources in mudflats.
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Figure 2: Photographs showing several bird casualties likely caused by marine litter, either through entanglement or ingestion.

वन्यजीव अनुसंधान और संरक्षण में कृत्रिम बुद्धिमत्ता (ए.आइ.) बनाम मानव प्रयास

- विजय जोशी

आर्टिफिशियल इंटेलिजेंस (ए.आई.) के उदय ने वन्यजीव अनुसंधान और संरक्षण सहित विभिन्न क्षेत्रों में इसकी भूमिका के बारे में बहस को जन्म दिया है। जैसे-जैसे ए.आई. तकनीकें विकसित होती जा रही हैं, अनुसंधान, फील्ड डेटा संग्रह और रिपोर्ट लेखन में उनका एकीकरण आशाजनक प्रगति और संभावित कमियाँ दोनों प्रस्तुत करता है। ए.आई. के सकारात्मक और नकारात्मक तथ्यों तथा मानव की कड़ी मेहनत और वास्तविक एकत्रित डेटा के पारंपरिक दृष्टिकोण के साथ तुलना करने पर धरातलीय स्थिति का पता चलता है।

ए.आई. अभूतपूर्व गति से विशाल मात्रा में आंकड़े संसाधित कर सकता है। वन्यजीव अनुसंधान में इसका अर्थ है कैमरा ट्रैप या सैटेलाइट इमेज जैसे बड़े डेटासेट का तेज विश्लेषण। ए.आई. एल्गोरिदम लाखों छवियों से प्रजातियों की पहचान और वर्गीकरण कर सकते हैं, जो कि एक इंसान को लगने वाले समय के एक अंश में होता है, जिससे अनुसंधान प्रक्रिया में काफी तेजी आती है। पैटर्न और विसंगतियों का पता लगाने की ए.आई. की क्षमता डेटा विश्लेषण में उच्च सटीकता की ओर ले जा सकती है। मशीन लर्निंग मॉडल को प्रजातियों, आवासों या व्यवहारों में सूक्ष्म अंतरों को पहचानने के लिए प्रशिक्षित किया जा सकता है, जो मानव आंखों से छूट सकते हैं। प्रभावी संरक्षण रणनीतियों के लिए यह सटीकता महत्वपूर्ण है।

ए.आई. वन्यजीव आबादी और पारिस्थितिकी तंत्र की वास्तविक समय की निगरानी को सक्षम बनाता है। उदाहरण के लिए, ए.आई.-संचालित ड्रोन बड़े क्षेत्रों का सर्वेक्षण कर सकते हैं और जानवरों की गतिविधियों, आवास परिवर्तनों और अवैध शिकार गतिविधियों पर लाइव अपडेट प्रदान कर सकते हैं। यह तात्कालिकता संभावित खतरों के लिए त्वरित प्रतिक्रिया की अनुमति देती है, जिससे संरक्षण प्रयासों की प्रभावशीलता बढ़ जाती है। इसका एक हालिया उदहारण तमिलनाडू वन विभाग द्वारा रेलवे ट्रैक पर लगाये गए ए.आई. सर्विलांस कैमरा है, जो ट्रैक को पार कर रहे हाथियों का पता लगा कर एक चेतावनी सन्देश देने का कार्य करते हैं, ताकि रेल को स-समय धीमा कर इन विशालकाय जीवों के दुर्घटना अनुपात को कम किया जा सके।

मानव विशेषज्ञता का नुकसान

ए.आई. पर बहुत अधिक निर्भर रहने से क्षेत्र-आधारित विशेषज्ञता में गिरावट आ सकती है। स्वयं जिज्ञासु बुद्धि द्वारा एक नए विचार को जन्म देने की शक्ति मानव की स्वयं की न होना, मानवीय विचार मात्र के लिए भी कृत्रिम बुद्धिमत्ता (प्रोद्योगिकी) पर निर्भर रहना मनुष्य के पिछड़ने को दर्शाता है। शोधकर्ताओं के पास अमूल्य प्रासंगिक ज्ञान और अंतर्ज्ञान होता है, जो मशीनों में नहीं होता है। जानवरों के व्यवहार की बारीकियाँ, पारिस्थितिकी तंत्र की सूक्ष्मताएँ और शोध के नैतिक विचार ऐसे क्षेत्र हैं जहाँ मानवीय निर्णय अपूरणीय हैं। रिपोर्ट अथवा शोध पत्र लेखन में ए.आई. उपकरणों का अपर्यवेक्षित उपयोग परिश्रमी शोधकर्ताओं के साथ अन्याय प्रतीत होता है।

शिक्षण क्षेत्र में ए.आई. का प्रभुत्व भी एक सोचनीय विषय बनता जा रहा है। बुनियादी शिक्षा से ही ए.आई. का बढ़ता प्रभाव आत्मनिर्भरता और स्व-विशेषज्ञता के लिए खतरा बन सकता है। यूनाइटेड स्टेट्स-स्थित विज्ञान केंद्र Pew Research Centre के शोधकर्ता लूना लिन द्वारा लिखे गए एक लेख में वह बताते हैं कि २०२३ में सेंटर द्वारा किये गए सर्वे के अनुसार सार्वजनिक K-12 शिक्षकों में से एक चौथाई (१४%) का मानना है कि K-12 शिक्षा में ए.आई. उपकरणों का उपयोग लाभ की तुलना में हानि अधिक है। साथ ही लगभग ३२% का मानना है कि लाभ हानि का मिश्रण सामान है।

ए.आई. सिस्टम उतने ही अच्छे होते हैं, जितने अच्छे डेटा पर उन्हें प्रशिक्षित किया जाता है। खराब गुणवत्ता या पक्षपाती डेटा गलत निष्कर्ष और गुमराह करने वाले संरक्षण प्रयासों को जन्म दे सकता है। डेटा की अखंडता और प्रतिनिधित्व सुनिश्चित करना एक महत्वपूर्ण चुनौती बनी हुई है। संरक्षण क्षेत्र में ए.आई. की तैनाती नैतिक और व्यावहारिक चिंताएँ पैदा कर सकती है। उदाहरण के लिए, वन्यजीव निगरानी के लिए ड्रोन का उपयोग जानवरों को परेशान कर सकता है या उनके आवासों में घुसपैठ कर सकता है। इसके अतिरिक्त, निगरानी या अन्य उद्देश्यों के लिए ए.आई. तकनीकों के दुरुपयोग के बारे में चिंताएँ हैं जो संरक्षण लक्ष्यों के साथ संरेखित नहीं हैं।

ए.आई. पर अत्यधिक निर्भरता ऐसी प्रौद्योगिकी पर निर्भरता पैदा कर सकती है जो सभी संदर्भों में टिकाऊ नहीं है। दूरस्थ या कम संसाधन वाले क्षेत्रों में ए.आई. सिस्टम के लिए आवश्यक बुनियादी ढाँचा और तकनीकी सहायता उपलब्ध नहीं हो सकती है, जिससे उनकी प्रयोज्यता और प्रभावशीलता सीमित हो जाती है। वन्यजीव अनुसंधान और संरक्षण में ए.आई. और मानवीय कड़ी मेहनत के बीच बहस को प्रतिकूल नहीं होना चाहिए। इसके बजाय, एक संतुलित दृष्टिकोण जो दोनों की ताकत का लाभ उठाता है, अधिक मजबूत परिणामों की ओर ले जा सकता है।

सारांश

वन्यजीव अनुसंधान और संरक्षण में ए.आई. का एकीकरण रोमांचक अवसर और महत्वपूर्ण चुनौतियाँ दोनों प्रदान करता है। ए.आई. की क्षमताओं को मानवीय विशेषज्ञता और नैतिक विचारों के साथ संतुलित करके, हम प्राकृतिक दुनिया की अपनी समझ और सुरक्षा को बढ़ाने के लिए प्रौद्योगिकी की शक्ति का उपयोग कर सकते हैं। वन्यजीव संरक्षण का भविष्य एक ऐसे तालमेल-पूर्ण दृष्टिकोण में निहित है जो मानवीय कड़ी मेहनत और ए.आई. समाधानों दोनों के मूल्य का सम्मान करता है।

About the Author:

Vijay is currently associated with the Wildlife Institute of India's Conservation Advisory & Policy Cell, where he works as a Technical-cum-Administrative Assistant. He holds a Bachelor's degree in Botany and Zoology from HNB Garhwal University and is currently enrolled in a Master's program in Environmental Science.

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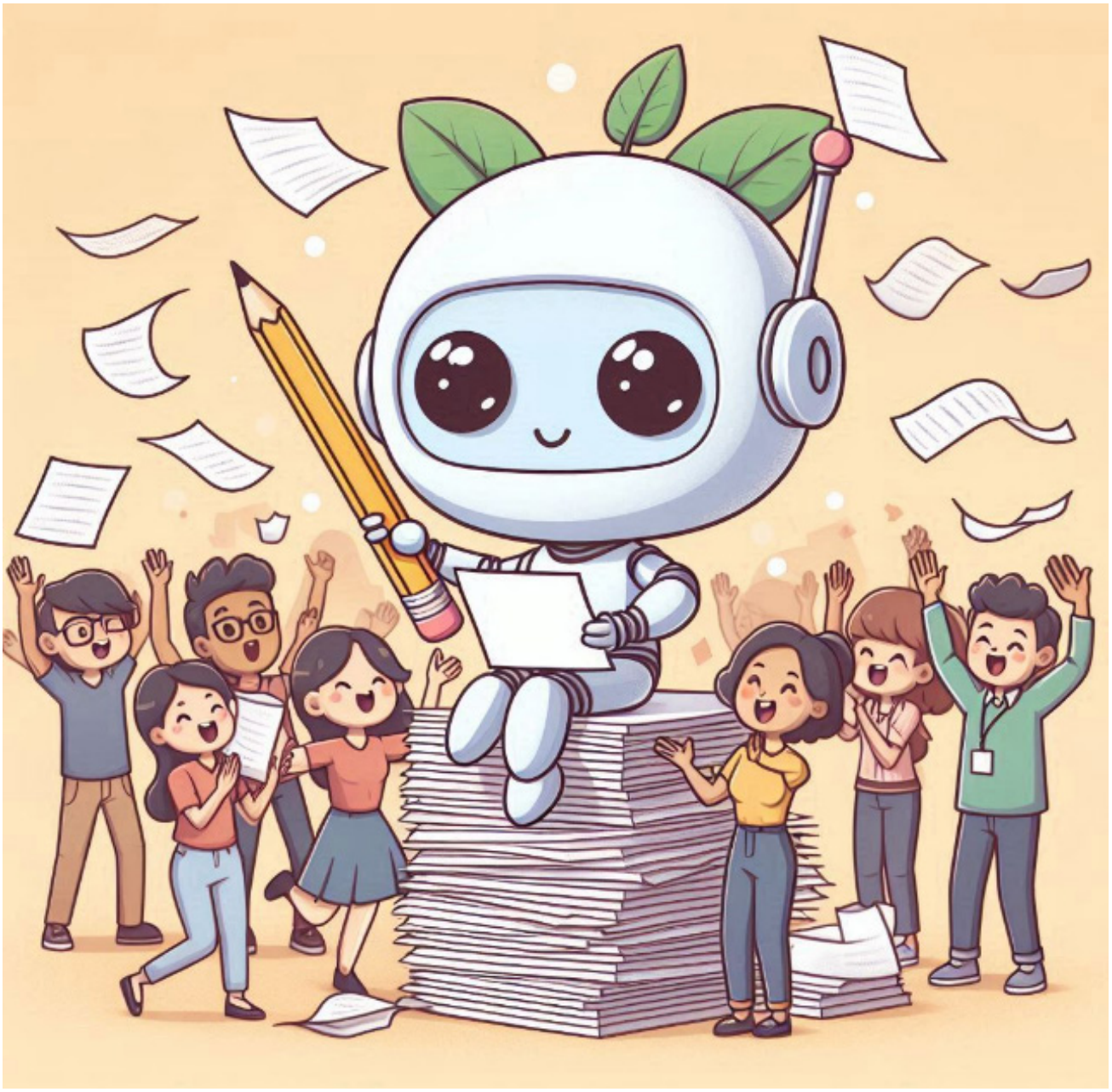


AI Generated Image

'KAL KE LIYE' :
A Perspective of Climate Change and Sustainability through Indian Mythology, Film and Literature

- Sohom Seal

The recent film "Kalki 2898 AD" brings ancient mythological themes into a contemporary context, offering a compelling narrative that resonates deeply with the current environmental crisis. Set in an imaginary world devoid of fresh air and water, "Kalki" depicts a dystopian future that serves as a stark warning and a call to action. The film introduces us to the town of *Shambhala*, where rebels fight for a better world, embodying the spirit of resistance and hope. This cinematic tale, interwoven with themes of climate change and holistic sustainability, mirrors the environmental challenges relevant to the modern world.

The film takes me back to my *Dada's* (grandfather's) fables from Mahabharata or Ramayana as a celebration of resistance and bravery towards righteousness, even when the odds seem insurmountable. He spoke of moral justice towards every matter on Earth. These stories, filled with vivid descriptions and underlying principles of morality, instilled in me a profound analogy in the movie hall. The stark contrast between these idyllic tales and the grim reality depicted in "Kalki" underscores the urgent need to revisit our ill-actions.

The film "Kalki" offers a powerful narrative that connects ancient mythology with contemporary environmental issues, providing valuable lessons and inspiration. It calls on us to embrace the spirit of Kalki—symbolizing renewal, righteous action, and the restoration of balance for a sustainable tomorrow.

A Dystopian Warning

In "Kalki", the world is on the brink of collapse, with natural resources depleted and ecosystems destroyed. The air is toxic, water is scarce, the environment is hostile to life, and the humans are running selfishly after monetary 'bounties' and the power of 'Supreme'. Though fictional, this setting reflects a potential reality of the present world if not rectified. The film's portrayal of a world devoid of fresh air and water highlights the dire consequences of unchecked pollution, deforestation, and climate change. This dystopian vision is a reminder that our actions today will shape the world of tomorrow.

The clash of Mahabharata revisited: Development vs. Conservation

A central conflict in "Kalki" is the modern-day warfare between the 'Complex,' driven by the quest for economic gain by the name of 'bounties', and *Shambhala*, representing the beacon of hope and resistance. This clash mirrors the real-world tension between development and conservation. The 'Complex' in the film symbolizes the industrial and economic forces that prioritize short-term profits over long-term sustainability, often leading to environmental degradation. On the other hand, *Shambhala* embodies the principles of sustainable living and the protection of natural resources.

Traditional Knowledge: The '*Aswathama*' for Nature Protection

The film emphasizes a heavenly power embodied in the form of '*Aswathama*' as a symbol of ancient wisdom. This concept underscores the value of integrating traditional ecological knowledge with modern science to develop sustainable solutions. Indigenous communities around the world possess a deep understanding of natural systems and sustainable practices that can act as '*Aswathama*': a staunch saviour of biodiversity.

My grandfather often shared stories about herbal medicines, their traditional remedies, and our ancestors' reverence for the natural world. These stories emphasized the importance of living in harmony with nature and respecting its cycles. The knowledge passed down through generations is a treasure trove of sustainable practices that can help us address modern environmental challenges. Embracing this wisdom is akin to harnessing the power of 'Aswathama' in our quest to protect and restore the environment.

Forests as '*Sumathi*': The Womb of Rebirth

'*Sumathi*', as depicted as the source of life and rebirth, aligns with the crucial role forests play in pioneering natural processes and restoring environmental resilience. In the film, the residents of *Shambhala* make all the arrangements to protect '*Sumathi*' in the last hope of securing a sustainable future. This reminds me of sacred groves, where nature resonates harmoniously with solace and belief above religious confinements. The concept of '*Sumathi*' in "Kalki" resonates with these childhood narratives, reinforcing the idea that forests are vital to the planet's health and our well-being.

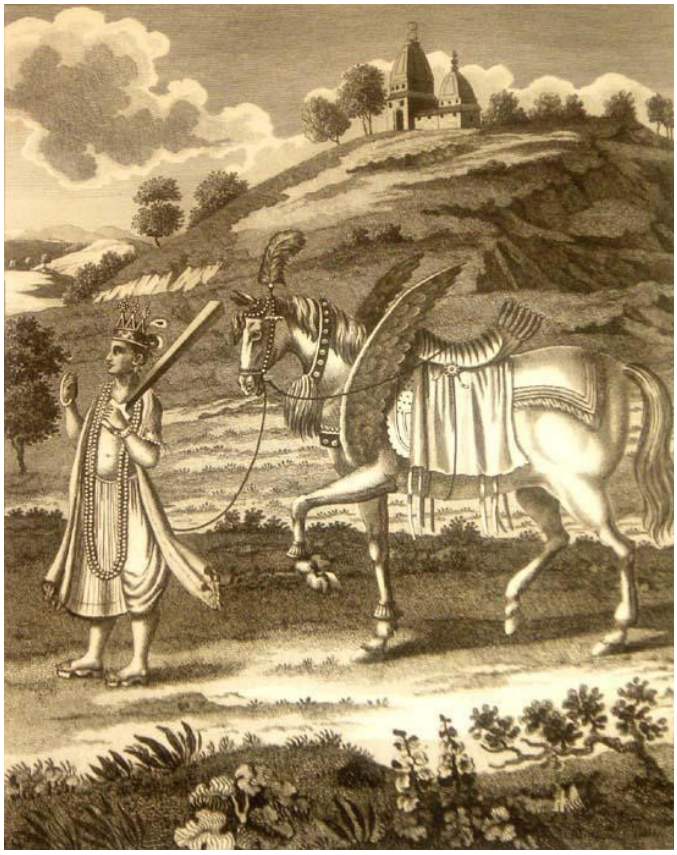
Connecting to Modern Day's Environmental Scenario

The modern world faces significant environmental and climate challenges, including air pollution, water scarcity, deforestation, and biodiversity loss. Major cities often struggle with poor air quality, and many regions experience severe water shortages. Deforestation and habitat destruction threaten the Earth's rich biodiversity. The imaginary world of "Kalki" serves as a cautionary tale, urging us to take immediate and decisive action to address these issues.

Climate change exacerbates these challenges, leading to more frequent and severe heat waves, altered rainfall patterns, and increased vulnerability to natural disasters. The urgency of the situation calls for robust policies, innovative solutions, and widespread public engagement to mitigate the impacts and adapt to new realities. The lessons from "Kalki" and the wisdom of past generations highlight the importance of protecting our natural heritage for future generations.

Optimism for future

As my grandfather used to conclude his narrative of different *Yugas*, my instant question was, "*Dada, Kolijug-er por ki*? (What is beyond Kalyug?)". He used to smile and reply, "*Kalki asbe, Satya jug shuru hobe*. (Kalki will come to reestablish the ultimate truth)". Hence, this inspires us with a sense of hope and possibility to build a future where nature and humanity coexist in harmony.



'***Kal ke liye:*** **for a better tomorrow"**

As we reflect on the imaginary world of "*Kalki*", let us draw strength and inspiration from the rebels of *Shambhala* and the resilience of *Aswathama* and strive to protect the Sumathi. Together, we can create a sustainable and prosperous future for India and the world. The deep-rooted culture of Indian mythology, coupled with modern scientific innovations, provides a roadmap for overcoming today's environmental challenges and securing a green and blue tomorrow for a peaceful rebirth.

এসেছে নতুন শিশু, তাকে ছেড়ে দিতে হবে স্থান :
জীর্ণ পৃথিবীতে ব্যর্থ, মৃত আর ধ্বংসস্তূপ-পিঠে
চ'লে যেতে হবে আমাদের।
চ'লে যাবো—তবু আজ যতক্ষণ দেহে আছে প্রাণ
প্রাণপণে পৃথিবীর সরাবো জঞ্জাল,
এ বিশ্বকে এ-শিশুর বাসযোগ্য ক'রে যাবো আমি—
নবজাতকের কাছে এ আমার দৃঢ় অঙ্গীকার।

Verses from "Chharpotro" (The Passport) by Sukanta Bhattacharya, first published in 1951, translated as:

"…
A child has arrived; it's time to give him/her a place:
From this dilapidated world, with the failed, dead, and decaying remnants-
we must leave.
I'll depart—but till I breathe the last
I'll do everything to clean this Earth of all debris,
I'll make this world liveable for this child—
This is my solemn pledge to the newborn.
…"

About the Author:

Sohom Seal is a PhD scholar in Wildlife Institute of India, trying to weave stories of conservation through technology. He joined the institute in 2019 in the Dugong Recovery Program and is currently working on criticality mapping of dugong habitats as a UGC-Senior Research Fellow.
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OUTREACH ACTIVITY IN WII DURING THE CAMPUS BIRD COUNT 2024

- Dr. Ashish Jha

The Campus Bird Count (CBC) is a citizen-science event, conducted annually during the month of February across the world, as a sub-event to the larger Great Backyard Bird Count (GBBC). In India, CBC is organised and coordinated by Bird Count India in collaboration with ebird.org (Cornell Lab of Ornithology). During the four-day event, birders (amateurs and experts alike) observe birds around them and upload their observations on the ebird database. This global coordinated effort helps document abundances and trends in bird populations across temporal and spatial scales.

Besides the science aspect of CBC, it is also a fun event and a great opportunity to get new people interested in bird watching. Given that WII is among India's most bird-rich academic campuses with over 360 species recorded so far, and a pool of dedicated researchers, we conceived an idea to conduct an outreach activity in the Campus during the CBC (16th-19th February 2024). The goal was to raise awareness and get common citizens interested in bird watching.

Mr. Vabesh Tripura helped us prepare bilingual posters for the event while the EIACP Cell helped us with the Google Form and advertised the program over Whatsapp groups and relevant social media platforms. Our target audience were amateur birders and the general public in Dehradun who may or may not have had any previous birding experience but were interested in learning about birds.

We invited people to WII in six slots during the four-day program. This event ran parallel to the CBC activities conducted throughout the day by trained birders in the campus, aimed at recording maximum bird species from the campus.

We received 99 registrations for the event, majority of them from students and bird enthusiasts outside WII and a few from WII researchers. On the specified day and time, participants gathered at the main gate and were escorted by WII volunteers during various slots. Dr. Ashish Jha, Ms. Amarjeet Kaur, Mr. Sipu Kumar, Mr. Anuranjan Roy, Ms. Malyasri Bhattacharya, and Mr. Manav S. volunteered to interact with the participants and take them on a guided birding tour along WII's nature trail. The participants were provided with pairs of binoculars and a 'Birds of Uttarakhand' pocket guide. The volunteers introduced the participants to the Campus biodiversity in general, and discussed the conservation/research works done by WII. The participants, in turn, shared their stories and interesting avian observations. Participants were given a bird Identification pocket guide as a souvenir. We hope that the participants continue to observe birds in their surroundings and contribute to the growth of citizen-science in the country.

Such an event is of special significance to a country like ours. So far, 1373 species have been recorded from India, making us the 8th most bird rich country in the world and 2nd in Asia, only behind Indonesia.

With over 2.8 million checklists uploaded by Indians on ebird.org, we are behind only the USA and Canada in terms of numbers of checklists uploaded. Birds are excellent sentinels of environmental health, and birdwatchers can help generate vital data across space and time to monitor avian populations in the country. The recently released State of India's Birds Report 2023 is one such scientific exercise which utilised data on the ebird.org portal to reveal interesting insights about the avian populations in the country. With a large bio-diverse geography to explore, rapidly increasing internet penetration, increasing environmental awareness and a large young population, the future of citizen-science looks promising in India.

About the Author:

Ashish Jha joined Wildlife Institute of India as Scientist C in August 2023. He is interested in avian conservation using a multi-pronged approach including genetics, long-term monitoring, field-based natural history studies and community outreach. His research interests include Population genetics, Biogeography, Natural History, Citizen-science, In-situ and Ex-situ conservation, Community ecology, and Avian behavior.

A typical Myristica swamp habitat
(**Image credit:** Siddarth Machado, under Creative Commons License)

EMERALD ENCLAVES :
The Uncharted Mysteries of the Myristica Swamps in the Western Ghats

- Toushif P.K.

Have you ever seen a Myristica swamp? These tree-covered tracts are situated in small, isolated strips within the evergreen forests of the Western Ghats. These freshwater swamps are some of the last remaining primary ecosystems in the contemporary world. They predominantly consist of tree species from the ancient Myristicaceae family, which once fringed the entire west coast up to the Western Ghats and represented a rich hydrological system in the region. Some of the most iconic trees include *Myristica malabarica*, *Myristica magnifica*, *Gymnacranthera canarica*, *Semecarpus kathalekanensis*, *Lophopetalum wightianum*, *Knema attenuata* and *Syzygium laetum*.

Historical Perspective

Looking back in time to around 65 million years ago, a meteorite impact in Mexico combined with the Deccan volcanic eruption episode led to the extinction of more than fifty percent of living species, including dinosaurs. The Deccan volcanism event is possibly one of the largest known eruptions, burying large regions of present-day Maharashtra, Karnataka, Telangana and Andhra Pradesh under hundreds of feet of lava. However, the southern Western Ghats, along with the Myristica swamp forests, the Congo Basin forests in Africa, and the Amazon Valley forests in South America survived the catastrophe.

Figure 1: *Myristica magnifica* – leaves (left) and fruit (right)
(**Image credit:** Navendu Page)

Adaptation and Survival

Adaptation is key to survival. Myristica swamps have adapted remarkably well, featuring complex root systems that make the terrain somewhat impassable. Their root systems are of the breathing or knee type, inverted U-shaped structures, that help them survive in anaerobic conditions. These large trees stand on soft, shifting soil through established air roots that grow on the main trunk and coil into the ground.

Habitat for Rhythmically Gifted Frogs

One of the fascinating inhabitants of these swamps is the small-sized frog known as the Kottigehar Dancing Frog (*Micrixalus kottigeharensis*), listed as Vulnerable according to the IUCN Red List. Endemic to the Western Ghats of Karnataka, this species is listed among the '100 Evolutionarily Distinct and Globally Endangered (EDGE)' amphibians. The male frogs can quite literally shake a leg, performing a behaviour known as 'foot-flagging'. This involves the rhythmic stretching of their long hind legs, flashing their slender, white-webbed toes to attract potential mates. "Only a few frogs in the world exhibit such intense visual signalling," says Madhushri Mudke, a researcher doing her PhD at ATREE on this unique species. Foot-flagging is also used to knock rival males off their perch, making it a fascinating multi-purpose dance.

Figure 2: Radiant fruits of the threatened *Gymnacranthera canarica*
(**Image credit:** Navendu Page)

Figure 3: Elegance on the forest floor: A rare glimpse of the female Kottigehar Dancing Frog
(**Image credit:** Bilal Shaikh, reproduced with permission)

New Discovery and Ecological Importance

A rich botanical find originated from the Myristica swamps in the Kathalekan forest in the Uttara Kannada district of Karnataka. In the year 2000, Mr. Dasappa and M H Swaminath discovered a large swamp tree species *Semecarpus kathalekanensis*, further extending the list of this kingdom's specific flora. With further research, the species has now been assessed by the IUCN as Critically Endangered. Many Myristica-dwelling species are now threatened with extinction and the mere existence of the swamps depends on several such species like the Malabar Tree Nymph butterfly (a pollinator), Great Hornbill and Lion-tailed Macaque which help in seed dispersal. Therefore, it is important to highlight the need to conserve these species for the stability of the swamps' ecosystem.

Myristica Swamps' Conservation

Myristica swamps are freshwater swamp forests that are very significant because of their specific biological, ecological and water regulation characteristics. They can help in recharging the groundwater as well as boosting the water table, besides protecting land from erosion. Furthermore, it plays an important role in absorbing carbon from the atmosphere, thus reducing greenhouse gas emissions and helping combat climate change. The survival and persistence of Myristica swamps is threatened by several factors, chief among them being anthropogenic activities such as deforestation, land-use conversion to agriculture, and other associated developments. These areas are pushed to the brink with human interference, pesticide and fertiliser contamination, and the proliferation of alien invasive species. Climate change has also affected rainfall regime and caused rise in ambient temperatures, thereby affecting the structure of these ecosystems. This has had a direct negative impact on the crucial ecosystem services provided by Myristica swamps.

Recent scientific studies reveal that the Myristica swamps in the Western Ghats host a multitude of species, including 79 tree species – out of which 23 are endemic – along with 26 shrubs, 27 climbers, and 44 herbs. The richest documentation of faunal usage in these swamps points out towards more than 630 species, ranging from flatworms to large mammals, including 14 species of fish and 56 species of amphibians from southern Western Ghats alone.

Notable fauna include the lion-tailed macaque (*Macaca silenus*), Malabar pit viper (*Trimeresurus malabaricus*), various species of Night frogs (*Nyctibatrachus sp.*), Malabar tree nymph (*Idea malabarica*), Clear-winged Forest Glory (*Vestalis gracilis*) and the Wayanad Laughingthrush (*Pterorhinus delesserti*). Preserving these swamps, therefore, is vital for maintaining the delicate balance of biotic and physical processes in the Western Ghats, an ecosystem of remarkable ecological importance.

About the Author:

Toushif worked as a Project Associate-I at the Wildlife Institute of India's Conservation Advisory & Policy (CAP) Cell during April-July 2024. With a profound passion for forest vegetation, he is dedicated towards exploring and understanding the intricate ecosystems of forest biomes. His research focuses on the biodiversity and conservation of plant species within these vital habitats, aiming to contribute to sustainable environmental practices. He is currently enrolled as a PhD scholar at the University of Chinese Academy of Sciences, Beijing since August 2024.
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Figure 4: Critically Endangered *Semecarpus kathalekanensis* (**Image credit:** Dasappa & Swam, under Creative Commons License)

A leopard is about to cross the wall situated along the Delhi-Haryana border

THE WALL THAT DIVIDES AND THE WILDLIFE THAT UNITES HARYANA AND DELHI

- Parvaiz Yousuf & Mukesh Chand

As the scorching summer months of May and June arrived this year, our daily excursions to the Asola Bhatti Wildlife Sanctuary (ABWS) became increasingly challenging. We braved the sweltering up to 50°C heat and navigated through Delhi's bustling streets on our motorbikes to reach the Sanctuary. In a city like Delhi, where urbanisation pressures are immense, finding a genuine wildlife haven is a rarity. While the city boasts of several 'city forest' patches and a well-managed Zoological Park, ABWS stands out as the sole Protected Area within the National Capital Territory (NCT), offering a unique opportunity to spot wild animals in their natural habitat.

As the only Sanctuary for wild animals in the NCT, ABWS has assumed greater significance. Located on the outskirts of Tughlaqabad, its boundaries merge with the neighbouring state of Haryana. Our research project involved setting up camera traps within the ABWS to identify and document the various species present in the area. Little did we know that these camera traps would unravel a fascinating story, far beyond our expectations!

Asola Bhatti as an Urban Sanctuary

The Asola Bhatti Wildlife Sanctuary, spanning 32.71 square kilometers, is a unique urban oasis situated on Delhi's southern Delhi Ridge, nestled within the ancient Aravalli mountain range. Despite being dominated by semi-arid tropical thorn vegetation – including the proliferation of the alien invasive Prosopis juliflora, which covers nearly 3/5th of the area, and lantana – the Sanctuary remains a vital refuge for numerous rare and remarkable species (Figure 1).

Figure: 1. Asola Bhatti Wildlife Sanctuary
(**Credit:** Mukesh Chand)

Historically, the ABWS was ravaged by large-scale sand and quartzite mining activities, which began in the early 20th century and peaked in the 1970s and 1980s, causing widespread habitat destruction and environmental degradation. In response, the Government of NCT of Delhi and conservationists launched a reclamation initiative to safeguard the forest area. Following its official designation as a Sanctuary in 1986 and subsequent renaming to Asola Bhatti Wildlife Sanctuary in 1991, a concerted effort was made to restore the habitat to its natural state, preserve biodiversity, and create a secure haven for diverse plant and animal species.

Despite Delhi's crowded and urbanised landscape, the Asola Bhatti Wildlife Sanctuary harbours a surprising array of wildlife, challenging the common perception among the city's residents that animals like hyenas and chital do not 'live' within their city limits. Our two-month camera trap survey revealed an impressive 20+ mammal species, a notable finding for an urban setting like Delhi. The Sanctuary is a vital habitat for several uncommon species, including the Striped hyena (*Hyaena hyaena*), leopard (*Panthera pardus*), Nilgai (*Boselaphus tragocamelus*), chital (*Axis axis*), sambar (*Rusa unicolor*), Indian crested porcupine (*Hystrix indica*), Small Indian civet (*Viverricula indica*), Asian palm civet (*Paradoxurus hermaphroditus*), Jungle cat (*Felis chaus*), and wild pig (*Sus scrofa*), among few others.

However, a concerning practice has been observed: the Forest Department's monthly expenditure of approximately ₹ 8 lakh (figures from 2018) to feed the Sanctuary's rhesus macaques (Macaca mulatta). We feel that this practice is unsustainable and may exacerbate human-animal conflict by causing an increase in the macaque population, rather than promoting a balanced ecosystem (Figure 2).

Figure: 2.Food provisioning of rhesus macaques in ABWS by Delhi's Forest Department
(**Credit:** Parvaiz Yousuf)

The Sanctuary's biodiversity is further highlighted by the presence of 253 bird species, underscoring the importance of preserving such natural areas within urbanised landscapes like Delhi. Alongside providing an opportunity for Delhi residents to connect with nature and appreciate the beauty of wildlife in its natural habitat, another recent major draw is the stunning Neeli Jheel within ABWS, boasting crystal-clear blue waters. Many book carts to reach Neeli Jheel, taking in the rich wildlife and scenic beauty of the Sanctuary along the way (Figure 3).

Figure: 3. Neeli Jheel in the Asola Bhatti Wildlife Sanctuary
(**Credit:** Parvaiz Yousuf)

Wall between the same Forest

The Sanctuary has a large perimeter of around 45 km. Our camera trapping endeavours yielded fascinating insights, particularly when we set up a camera near a breach in the wall separating Asola Bhatti from the adjacent Reserved Forests in Haryana. The footage revealed a surprising frequency of wildlife movement, with leopards, nilgai, and other animals utilising this gap almost daily to traverse between the two areas (Figure 4).

Figure : 4. Leopards captured crossing the wall that separates Asola Bhatti WLS with Haryana's forests (camera trap image)

Regrettably, the NCT Government constructed this wall to demarcate the ABWS boundary without fully considering the ecological implications. The barrier effectively isolates animals within a contiguous forest, causing fragmentation. In many sections, the wall exceeds 10 feet in height, posing a significant obstacle for numerous species (Figure 5). It's akin to envisioning a wall erected within our own homes, even if the Department's reasoning might be to prevent bootlegging and encroachment, among other issues.

Fortunately, the breach in the wall facilitated mammal movement, and we observed frequent usage by species like chital and leopard. This highlights their need for expansive, connected territories. Other users of the gap included the striped hyena and jungle cat. Witnessing this diverse array of wildlife underscored the Sanctuary's vital role as a wildlife corridor.

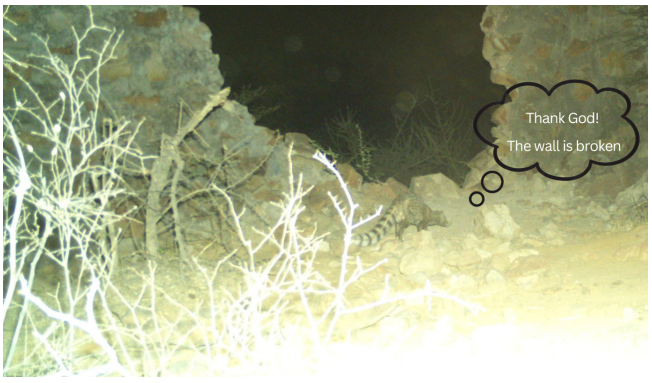

Figure : 5. Small Indian civet (camera trap image)

Ecological Issues due to the Wall

As the forested ecosystem recovers from its mining past within ABWS, and as its floral and faunal communities increase in density and diversity, the most critical ecological issue that has emerged is that of habitat fragmentation by this perimeter wall, restricting the free movement and intermingling of species populations. Large animals, such as leopards and nilgai, require expansive areas for feeding, mating, and raising their young. However, the presence of a wall between their habitats limits these natural behaviours, leading to increased competition for resources on either side. This, in turn, can result in heightened conflicts between animal groups on both sides of the wall (Figure 6).

Figure : 6. Nilgai (camera trap image)

Simultaneously, smaller animals like civets and mongooses face significant challenges crossing the barrier, hindering their access to food and potential mates. This could lead to the potential reduction in genetic diversity, in turn leading to less healthy and resilient species populations, making them more susceptible to diseases and environmental changes. Furthermore, animals attempting to circumvent or breach the wall often suffer injuries. While species like Nilgai exhibit rational behaviour to avoid human encounters, others like porcupines might be unable to cross the wall if it weren't for the existing breach (Figure 7).

The wall also compromises the Sanctuary's role as a wildlife corridor, crucial for facilitating the free movement of animals between Delhi's and Haryana's forests. This disruption can isolate populations, causing ecological imbalances and biodiversity loss. The altered interactions between animals can, in turn, modify ecosystem dynamics, ultimately affecting the delicate ecological balance between predator and prey populations in the Aravallis.

Recommendations and Conclusion

We strongly feel that the Forest Department must holistically assess whether parts of the walled perimeter of ABWS, especially in areas/sections that connect forests of Delhi and Haryana and harbour higher animal densities, could be brought down.

Alongside increased protection measures such as regular and effective foot patrolling by sufficient number of forest staff, the law of the land must be strongly enforced to prevent/free encroachment of forestland and book anti-social elements. This will reduce the necessity for the wall in the first place, critical sections of which could be gradually dismantled enabling animals to move freely between habitats. The Department may also consider establishing or reviving habitat corridors with native vegetation plantation, which will provide a safe and familiar environment for animals to move across. Further research is necessary to understand the wall's impact on animal movement and identify suitable plant species for corridor plantations. Leveraging technologies like drone-mapping and GPS tracking can inform corridor placement and help monitor animal movement.

Lastly, the governments of NCT of Delhi and Haryana must collaborate to address this issue, involving the forest departments of both states in the decision-making process. Raising awareness among local communities, such as those in Sangam Vihar and Bhatti, is crucial for effective Sanctuary management and protection. By engaging with stakeholders and fostering cooperation, we can work towards creating wildlife-friendly urban landscapes that prioritise connectivity over barriers.

The perimeter wall within the ABWS highlights the need for a more nuanced approach to urban planning and wildlife conservation. Through targeted interventions and collaborative efforts, we can transform our cities into thriving habitats that support biodiversity and maintain ecological balance.

Figure : 7. Indian crested porcupines (camera trap image)

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Figure : 8. Nilgai (camera trap image)

NATURAL HISTORY OBSERVATIONS FROM CHURDHAR WILDLIFE SANCTUARY

- Manav S., Michael Rayen, Sakshi, Shikhar Kaushik & Sujay G

Nestled in the outer Himalayas in the Sirmour district of Himachal Pradesh, the Churdhar Wildlife Sanctuary stands as a hidden gem, rising to an impressive elevation of 3,600 metres at its peak. The Sanctuary contains diverse terrain and rich biodiversity driven by differences in gradient, slope, aspect and edaphic factors. These variations result in two primary forest types within the Sanctuary—Himalayan moist temperate forests and sub-alpine birch and fir forests—each hosting its own mosaic of life.

Our journey began at Noradhar, a village perched at 2100 m, dominated by Banj oak, moist deodar, and moist temperate deciduous forests. Species like *Quercus leucotrichophora*, *Quercus floribunda*, *Rhododendron arboreum* among others made up the primary floral elements along with lush herbaceous plants such as *Sauromatum venosum* and *Potentilla indica*. The flora transitioned dramatically as we ascended toward Shirgul temple from 2500 to 3000 m, where the forests gave way to a mix of Kharsu oak and Western mixed conifer forests. Here, trees such as *Pinus wallichiana* and Abies pindrow stand tall, with cones of *Picea smithiana* waiting to disperse their seeds. At the highest reaches of the Sanctuary, between 3000 to 3600 m, the landscape begins to resemble the sub-alpine regions of the greater Himalayas. *Rhododendron campanulatum* shares the slopes with *Betula utilis*, creating a dense, dynamic ecosystem.

For bird enthusiasts, Churdhar is a paradise. Even under heavy fog and relentless rain, we recorded an impressive 83 bird species over four days, many of them lifers. From the lowland oak forests of Choras (1900 to 2200 m), which echoed with the calls of Himalayan Black-lored tits, Great Barbet,

Wedge-tailed Green-pigeons and different woodpeckers, to the rocky streams where Brown dippers flitted along with Spotted forktails and Plumbeous redstarts, we marvelled at the variety. We were greeted by the sweet whistle of the Blue Whistling-Thrush, which heralded the start of our day. Mixed-species flocks often composed of Grey-hooded warblers, various species of tits, laughingthrushes, woodpeckers and even Rock thrushes, weaving through the forests, foraging, was a common but fascinating sight. The lower elevations were a mosaic of forests and farmlands, therefore, human commensals such as mynas, sparrows, crows as well as open area specialists such as Rock Bunting, Yellow-breasted Greenfinch, Himalayan Prinia were present.

As we hiked higher, the birdlife transitioned once more, with forest specialists such as White-tailed nuthatches and Bar-tailed treecreepers making an appearance. Mystery bird calls echoed through and we found ourselves going off-track trying to identify the culprits which turned out to be a pair of Black and Yellow grosbeaks high up in the canopy mobbing a poor Asian Barred Owlet. At an elevation of 3000 m, beyond the timberline, the forests give way to alpine scrub (krumholz) dominated by Rhododendron campanulatum bushes. Here, we encountered alpine specialists like the Gray-sided Bush warblers actively vocalising to mark and defend their territories. Majestically soaring up above were raptors such as the elusive Bearded Vulture, Himalayan Griffon and a rare Eurasian Hobby, darting through the mountains with lightning speed, while below, the undulating valleys echoed with the sounds of nature.

Churdhar not only hosts an incredible diversity of life but also a sheer variety of beautiful landscapes. The valleys here are surrounded by towering mountains, their slopes blanketed by dense deodar, oak, and pine forests. From the rare Musk deer and Himalayan black bears to leopards that stealthily navigate the wilderness, this Sanctuary protects a range of charismatic megafauna and a wide array of birds. On our way back to retrieve the camera trap that we had deployed on the first day, a couple of us encountered a leopard in an extremely narrow, and slippery path consisting of boulders and flanked by tall grass on both sides. As the eyeshine slowly descended from the side of the path and stood around 10-15 feet ahead of us, we foolishly panicked, turned back and ran, luckily not slipping on the slippery boulder path.

Only once we reached a good 50-100 metre away from the leopard did we look back; our adrenaline-filled bodies decided not to retrieve the camera trap the same night, but the following morning.

In the midst of our exploration, we found ourselves mesmerised by the smaller inhabitants of Churdhar. The cacophony of cicadas reverberated through the eerie forest setting, lending an irreplaceable charm to the forest. The riparian habitats promised some odonate treasures like the "banded krait" (or common clubtail) dragonfly, *Ictinogomphus rapax*, and the brilliantly metallic Lestidae damselflies. Ephemeral puddles in and around Churdhar also had *Orthetrum* sp. dragonflies. In the same stream flowing through the centre of the forest, we heard calls of Nepal Paa Frog *Nanorana minica* and saw large individuals of the less vocal, and mucus-secreting Murree Hills Frog Nanorana vicina. A bright flash of green, and there was a beautiful Assam sucker frog *Amolops formosus* sitting on a moss-covered rock unperturbed by our close proximity. As we moved through the Sanctuary, every step brought new discoveries, from the colourful butterflies fluttering among the alpine flowers to the rustling of pikas dashing between boulders.

One of the most memorable moments was the sighting of a Himalayan keelback, a docile snake, basking in the early morning sun by the roadside. The simplicity of its patterning and chocolate brown colouration, brought to mind the Nilgiri keelback of the Western Ghats. Despite these astounding sightings, what we most wanted eluded us; the Himalayan pit viper (*Gloydius himalayanus*) and the Nepal pit viper (*Trimeresurus septentrionalis*). Nevertheless, we remain hopeful for the future, knowing that Churdhar's secrets will reveal themselves slowly, in their own time.

However, the Sanctuary is not without its challenges. The degradation of land by cattle and tourists is a persistent problem here. Gujjar settlements, along with their livestock, impose significant stress on the landscape, trampling shrubs and grasses, and contributing to forest degradation. Forest gaps have appeared in areas that were once dense with trees. The presence of tourists—approximately 2,000 per day—compounds these pressures, with stray dogs further endangering local wildlife. The presence of invasive plants, trampling by cattle, and uncontrolled lopping for feed have further strained the delicate balance of this ecosystem. Despite this, Churdhar retains much of its ecological integrity, and efforts continue to maintain its biodiversity.

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MILESTONE IN THE MEGA-HERBIVORE CONSERVATION :

The Gaur Reintroduction In Sanjay Tiger Reserve

- Parag Nigam

As a part of the collaborative initiative between Wildlife Institute of India and Madhya Pradesh Forest Department, a gaur (*Bos gauras gauras*) re-introduction plan 2023-28 was developed in early 2023. It envisaged the reintroduction of 50 gaurs in Sanjay Tiger Reserve. As Phase I of the project, a total of 28 gaurs from Kanha (during 1st and 7th June, 2023) and 16 gaurs from Satpura Tiger Reserve (between 26th and 29th June, 2023) were successfully captured and translocated. With culmination of Phase I in June 2023, the remaining six gaurs were captured from Kanha Tiger Reserve during April 2024 and translocated to Sanjay Tiger Reserve completing the reintroduction of a population of 50 gaurs within a period of nine months.

This fieldwork represented a multifaceted triumph for conservation.

The field operation was initiated in Kanha Tiger Reserve from 1st April, 2024 with the team of Park managers, veterinarians, biologists, and the front-line staff, initiating necessary preparations for the captures scheduled on 8th and 9th April 2024. These included identifying herds and individuals chosen for capture, acclimating captive elephants with the gaur herds to allow for closer proximity and ease of darting, arranging transport vehicles, conducting regular mock drills of animal weighing, carrying loads over distances and loading them onto trucks.

It also included ensuring the availability of appropriate drugs, medicaments, equipment and support systems, as well as clearly defining roles and responsibilities of the personnel involved in capture operation. Efforts were simultaneously made towards the preparation of a soft-release enclosure at Sanjay Tige Reserve suitable for holding animals during the initial phase.

Once the preparations were made, the field operation was initiated on 8th April 2024. The day started with the team assembling at the focal point at Kisli Forest rest house and initiating the final checks and preparations required for the operation. After carrying out mock drills and ensuring that all the arrangements were in place, the field operation started in the afternoon. Weather conditions were conducive, and decision was taken to go ahead with the captures. The monitoring team reported a herd of 12 individuals (part of the larger herd of 18 individuals) near the Kisli road. Upon receiving the information, the core team deployed the captive elephants to the location where the gaur herd had been sighted. The herd was observed grazing comfortably in the open Kisli meadow alongside Barasingha and Chital in the company of egrets, hopping over these animals and enjoying the afternoon insect meal.

The darting team reached the site and approached the gaur herd on elephant back. Captive elephants were successful in gently moving the herd towards an open area. A seemingly healthy individual was identified based on its distinct features: (i) a young adult bull whose horns were placed wider apart on the poll, extending outwards first before curving inwards with the sharps tips pointing upwards; (ii) muscular and elevated dorsal ridge, (iii) a dark body coat, and (iv) the size. The young bull was targeted for darting which was carried out in a manner that the animal was subjected to minimal stress. The animal was darted using a drug mixture of Thiafentanil (narcotic) and Azaperone (a short acting tranquilizer). The animal came down on sternal recumbency within three minutes of darting. The animal was approached, blindfolded, evaluated for physiological parameters, weighed, collared, and shifted onto the stretcher for carrying to the transport container positioned on the road head. Moving the gentle giant onto a stretcher and then transporting it to the truck was truly a commanding task. A team of 16 strong frontline staff duly trained in the procedure during mock drills made the whole exercise possible.

Once the animal was loaded onto the transport container, efforts were made to ensure that the animal was positioned on sternal recumbency and administered intermediate (Haloperidol) and long acting tranquilizers (Perphenazine enanthate). These drugs provided tranquilization effect throughout transportation and acclimatization at the release site. The animal was subsequently revived using Naltrexone hydrochloride and it took about two minutes for the animal to recover and stand upright.

While the animal was loaded onto the truck, the captive elephants managed to keep the herd intact and guarded. The team rushed again towards the gaur herd, but the weather suddenly changed with heavy clouds covering the sky along with lightning, thunderstorms and heavy downpour that made the conditions quite challenging. The team waited out in the open for almost 30 minutes for the downpour to settle. The gaur herd also took shelter under a tree. A short open window appeared to our pleasant surprise through the ominous clouds and without any delay, a young adult cow was darted, and similar procedures were carried out resulting in having two animals in the container. The sky gradually cleared and although daylight was still available, it was decided to schedule further captures for the next day, as the entire team was drenched and elephant *howdah* (saddle) was wet making the harness ropes tight and uncomfortable for the elephants.

After ensuring that the captured animals were comfortable and there was enough supplemental fodder in the container, the journey was initiated. A team constituting of field officers, veterinary professionals and support staff accompanied the animals. The journey of about 400 kms to Sanjay TR took almost 12 hours. Multiple stoppages were made on the way to check animal fitness, provision fodder and water. The team reached Sanjay TR in the morning and the animals were released in the soft release enclosure which was specially made to contain the animals for the initial period. This enclosure served as a transitional space where the gaur could adjust behaviourally and acclimatize to the new environment. Furthermore, it allowed the animals to recover from the effects of tranquilizers. Holding herding animals in soft release enclosures helps in the development of cohesiveness and herd formation, which is important once the animals are released in the open forest.

Similar field capture operation was continued on 9th April, 2024 in Kanha and three adult cows and one bull were successfully captured and loaded onto the transport container within a short period of 3 hours. Two transport trucks were used for carrying these four animals. As carried out previously, the transport team comprising of field officers, senior veterinarians and support staff accompanied the animals. As the journey took place during the day, special measures were taken to keep the animals comfortable throughout the long journey. The evening brought with it pleasant weather due to the rain, making the journey quite comfortable. The transport trucks reached Domarpaat, the location of the soft release enclosure, during wee morning hours and the animals were released inside the enclosure. Every animal exited the vehicle comfortably and rushed into the thicket of bamboo which was present within the enclosure. The project research team and the identified monitoring staff of Sanjay TR were assigned with the monitoring duties of the newly supplemented gaur.

The sweet chirping of birds, the cool, bracing weather, and the refreshing morning breeze along with the sunrise illuminating the gaur comfortably grazing as a herd in the open area of the enclosure, was a sight to behold. It was a delight to watch the herd in their new home.

Overall, the successful capture and translocation of 50 gaurs in Sanjay National Park represents a triumph of collaborative conservation efforts, highlighting the potential for positive change when professionals work together to protect our planet's biodiversity. This effort is a testimony to the collective efforts of forest officials, scientists, experienced veterinarians, and wildlife experts, who worked tirelessly to ensure the safety and well-being of the gaurs throughout the process.

The successful establishment of the existing gaur in Sanjay TR reintroduced during June 2023 and the addition of these six gaurs during April 2024 provides hope that Sanjay Tiger Reserve would become a stronghold of this mega-herbivore in future and re-establish the linkages with other adjoining reserves.

About the Author:

Parag Nigam started his research career in 1995 with his master's degree research on livestock diseases and their impact on animal health. Later, he served in the Remount & Veterinary Corps of the Indian Army in the Field Veterinary Hospital and Central Military Veterinary Laboratory, Meerut until 2002. His interest lies in studying diseases in wild populations and managing wild animals in distress. He provides teaching and training inputs in the area of wildlife health management; immobilization and restraint of wild animals; and health management of wild animals in captivity. He has carried out a number of wildlife rescue and rehabilitation operations for various states of the country.

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