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# Sanctuary Asia

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## PLANET EARTH IN DANGER

Promises made...  
and broken

## WILL DIBANG VALLEY BE SAVED?

An update on the fight to protect  
a Global Biodiversity Hotspot

## THE ELEPHANT IN THE ROOM

Human-elephant conflict  
and more



Photo Credit: Dr. Anish Andheria

## FOREVER STRIPES

The survival of the tiger and all the creatures that share its habitat, including leopards, wild dogs, elephants, rhinos and uncounted plants, insects, birds and reptiles, depends on whether humans can set aside vast undisturbed wildernesses for nature.

The wildlife conservation movement needs the support of us all. For more information on how you can help, or to pledge your support for those who work round-the-clock to protect our wildlife, write to Dr. Anish Andheria (President, Wildlife Conservation Trust) at [anish@wctindia.org](mailto:anish@wctindia.org) or visit [www.wildlifeconservationtrust.org](http://www.wildlifeconservationtrust.org)

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# 38

## NEHA SINHA



*Author of the critically-acclaimed 'Wild and Wilful - Tales of 15 iconic Indian species', she heads Conservation and Policy at the Bombay Natural History Society. Her writing engages with and stirs readers of all generations.*



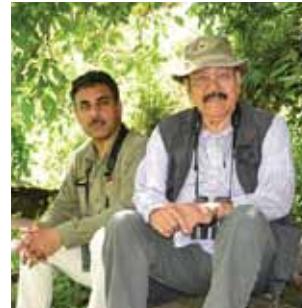
# 44

## DR. RAM GOPALAKRISHNAN

*A physician based in Chennai, he enjoys birding in out-of-the-way locations, learning about the avian world and writing about them. His articles on travel and birding have been published in magazines including Sanctuary Asia and on blogs.*

# 48

## INTESAR SUHAIL AND ASAD RAHMANI



*Wildlife Warden, Department of Wildlife Protection, J&K, Intesar Suhail is presently in charge of managing the Tral Wildlife Sanctuary. Dr. Asad Rahmani, Former Director, BNHS, is interested in conservation of all species and habitats, particularly neglected ones.*



# 62

## PEEYUSH SEKHSARIA

*Delhi-based amateur naturalist, wannabe illustrator and occasional writer, architect and geographer by training, he is a regular contributor to Sanctuary Asia.*

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**Issued in the interest of wildlife**

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### On the cover

A Spot-bellied Eagle-owl *Bubo nipalensis*, in Karnataka's Nagarhole National Park, with its kill, an equally elusive creature, the Indian giant flying squirrel *Petaurus philippensis*. The image perfectly encapsulates the essence of our cover story... **Earth in Danger.** At virtually every global meeting, political leaders, scientists, economists, human rights champions, even young children, agree that our natural ecosystems, together with their species diversity, are key to the continued survival of life on Earth.



Photographer: Sujith Surendran

### NEWS

- 8 World Scan** Over 350 new species described in 2022; war in Ukraine destroying the country's rich biodiversity; ban on ivory leads the trade to hone in on hippo teeth! The Amazon shrinks by 10 per cent in the last four decades; no consensus on Antarctic Ocean habitat protection.
- 9 India Scan** New species of wren babbler found in Arunachal Pradesh; *Wildlife (Protection) Amendment Bill* passed despite opposition; same routes used to smuggle wildlife and to traffic people, weapons and drugs; India's air quality worsens; bird identification app Merlin, now in two more Indian languages.
- 10 Climate Watch** ExxonMobil internally knew about climate impacts while publicly denying climate science; extreme weather events resulted in around 168 billion USD damages in 2022; switch to renewables to accelerate in coming years; more Joshimaths written into our future.



### PHOTOFEATURE

- 12 Cloaked in the Power of Invisibility** Evolution has given creatures the incredible ability to hide in plain sight thanks to adaptations that camouflage them, or help them to merge into their background. Look closely, and the grass you see might reveal a bird, a leaf billowing in the wind could turn out to be an insect!

### 24 Cover Story

**A Global Commitment for Protecting People and the Planet** The last year ended with a tiny glimmer of promise for biodiversity conservation – a Global Biodiversity Framework (GBF) was agreed upon, but it requires currently elusive political commitment by nations to actually halt and reverse nature loss by 2030. The GBF recognises the need to restore at least 30 per cent of degraded terrestrial ecosystems (in fact the biosphere probably needs 50 per cent), inland waters, coastal and marine ecosystems. As **Vishaish Uppal** and **Aparna K.** share the details of this agreement, and **Justin Mohan** weighs in on India's position, **Rituraj Phukan** talks about indigenous representation, **Shruti Ajit** lays out gender perspectives, and **Shruthi Kottillil** gives voice to the young who will inherit the planet.

- 52 The Elephant in the Room** Trigger warning! Brace yourselves for images of wild elephants caught in the crosshairs of human civilisation. The images are heart-wrenching, but key to our determination to allow them to roam their vast wildernesses again.

### PEOPLE

- 32 Meet Dr. M. Monirul H. Khan** In Dhaka, **Bittu Sahgal** met with the

determined and highly celebrated Bangladeshi wildlife biologist to chat about all things Sundarban.

### 36 Ramki Sreenivasan Bikram

**Grewal** pens a personal tribute to this fearless photographer and co-founder of **Conservation India** who left us far too soon.

## CONSERVATION ACTION

**38 A Misplaced Safari** Instead of a proposed gigantic safari and zoo project, the Aravallis should have a giant, protected, ecological zone, demand citizens living near the Aravallis, who have worked against odds for a decade to restore this wildlife haven. They now ask us all to work with them to save this critical natural haven, writes **Neha Sinha**.

### 58 How a Water Heater Can Change Lives

Deep in the forests of Maharashtra's Chandrapur district, a simple water heater is saving lives and reducing human-animal conflict, writes WCT's **Rizwan Mithawala**.

### 70 Will Dibang Valley Be Saved?

The MoEFCC's Forest Advisory Committee has rejected the Etalin Hydro Electric Project project in Arunachal Pradesh, in its present form, and has asked the state to file a fresh proposal. *Sanctuary*'s Assistant Editor **Francesca Cotta** provides an overview of the project, highlighting community efforts to protect this biodiversity-rich region.

## BIRDING

### 44 The Eight Passage Deities of Kutchh

**Ram Gopalakrishnan** and his friends make a pilgrimage to the western-most tip of India in search of coveted avian species headed for their wintering grounds. He found himself blessed with unexpected, incredible sightings.

## IN THE FIELD

### 48 Tral: A New Gem in J&K

**Intesar Suhail** and **Dr. Asad R. Rahmani** explore the unique biodiversity and vital importance of the newly-declared Tral Wildlife Sanctuary in India's northern-most region of Jammu and Kashmir.



70

## 62 The Curious Case of the 'Goatbuck'

An unexpected mammal in the midst of a flock of goats caught **Peeyush Sekhsaria**'s attention as it daintily foraged in the agricultural landscape of Maharashtra's Aurangabad district. What was it?

### 64 Rajaji: Elephant and Leopard in Tigerland

While monitoring invasive species in the Rajaji Tiger Reserve, **Sipu Kumar, Rounak Patra, Navendu Page** and **Amit Kumar** come face to face with wild species that have made this remarkable, and troubled, forest their home.

## NATURAL HISTORY

### 68 A Mournful Morning

While following a disturbed mother leopard, **Subhasish Bhandari** discovers her unusual and haunting interaction with her cub.

### 74 A Snowy Embrace in a Hot Spring

On top of a freezing mountain in Japan, **Arindam Bhattacharya** witnesses a tender moment between a snow monkey and her baby.

### 86 Sanctuary Papers

Oddments of natural history with a smattering of scientific discoveries thrown in for good measure.

## PROJECTS

### 76 Mud on Boots

The latest news from our very earthy Project Leaders and the vital work they do.

### 78 Updates from the Field

Notes, anecdotes and reports from Sanctuary Nature Foundation's projects across India.

## PHYTOFOCUS

### 84 Flowers in Unusual Places

**Soham Kacker** ponders over cauliflory – the convergent evolutionary behaviour of plants bearing fruit and flowers directly on their stout trunks.

## CAMPAIGN

### 90 Give Walayar's Elephants the Right of Way

**Arul Badusha** and **Abhijith A. V.** explain why the famous Palakkad Gap has been turned into an elephant death trap.

## REVIEWS

### 92 Book Reviews

**Ashish Kothari** reviews *Bird Tales from the Himalayas* written by Sanjay Sondhi and illustrated by Anusha Menon; **Shatakshi Gawade** reviews Sumanas Koulagi's *Development as Swaraj*.

## LEAVES FROM THE PAST

### 94 Sleeping in 'Khairi Niwas'

Join **Raza Kazmi** as he spends a night in a home once shared by a tigress and her 'human family'.

## YOU SPEAK

### 95 Networking

What's the buzz on

Sanctuary's social networks?

### 96 Reader's Forum

Where you can

comment, lament, compliment!

## LAST WORD

### 98 An image that speaks a thousand words.





**Bittu Sahgal,  
Editor, Sanctuary Asia**

## Poti's Justice

This image (one of my favourites) was taken in 1994, in the Rajaji National Park, as part of the Indian People's Tribunal (IPT) on Environmental and Human Rights. As is my wont, I took time off to sit with the children living in Buggawalla, in the very heart of one of India's most vital elephant and tiger habitats.

All of us involved – social activists and wildlife defenders – had placed our fullest faith in the late Justice P.S. Poti, former Chief Justice of the Kerala and Gujarat High Courts, whose decisions we agreed should guide our future strategies to protect India's biodiversity, while protecting the rights and livelihoods of those living next to India's biodiverse geographies.

Our united purpose at Rajaji was to find extrapolatable ways to deliver environmental justice and equity to the local *Gujjar* and *Baan* (grass worker) communities... *without* compromising the ecological security of the biodiverse Protected Area network and other biodiverse ecosystems all across India.

Today, sadly, with climate change having turned into a crippling climate crisis, India has *still* not comprehended that *every* human endeavour is subject to, and dependent on, the ability of the biosphere to deliver the 'gifts' we have thus far taken for granted... clean air, pure water, fertile soil and a stable climate.

India is a great nation, with a history of nature study and worship. Down the centuries it is this trait that enabled us to survive and absorb all manner of threats including invasions, colonisers and wars. And it is this trait that can lead us out of the self-dug, bottomless pit into which all nations of the world continue to be pushed.

Soon after Justice Poti's report, Project Tiger was the first government agency to officially accept one of the most important recommendations made by his final report, namely that there should be *no forced displacement* of any local communities, adding that those *willing* to move out should, nevertheless, be *assisted* to do so. He also underscored the vital importance of maintaining the ecological health of Rajaji (and India) by recommending "a moratorium on conversion of agricultural or forest land around the park to non-agricultural, or non-forest use".

Even handedly, the IPT Report also recommended "An improvement in the service conditions of the officers and staff of the Forest Department, who work under great stress and suffer from lack of motivation."

The report was officially released by Kalpvriksh and Sanctuary to villagers, NGOs and Wildlife Institute of India (WII) scientists at Buggawala village, in the Rajaji National Park on April 22, 1994.

Much water has flown under the bridge since the publication of this near-forgotten report. Yet, its relevance, considering subsequent reports such as *The Stern Review*, the *IPCC reports*, *The Dasgupta Review* and the *IPBES report*, clearly endorse the advice of that giant of a man... Justice P.S. Poti.

*Poti's Justice* continues to shine a light for humans looking for a way out of the climate *cul de sac* towards which powerful carbon cowboys and biodiversity-destroying development 'experts' are resolutely pushing us. 



## NEW SPECIES DISCOVERED IN 2022

From fragile-looking stick insects to towering dinosaurs, scientists at the Natural History Museum (NHM) described 351 species of plants and animals new to science in 2022. A majority of the species described are invertebrates, and the biggest chunk of these are 85 wasps. These discoveries were made from remote locations across the world and by studying the 80 million objects held in NHM. Other species include 84 beetles, 34 moths, 23 moss species, 19 stick insects of Australia, 13 trematode worms, 12 protists and seven flies. At eight millimetres in length, six of the seven species of newly-described frogs of Mexico are among the smallest known vertebrates. Scientists also described three dinosaurs in 2022 – the oldest ever stegosaur, Asia's oldest and most complete armoured dinosaur, and a tiny-armed carnivore. In the plant kingdom, 11 algae and four plants were described.

## THE AMAZON IS SHRINKING

Over the last four decades, the Amazon, home to one in 10 species of the planet, has lost 10 per cent of its native vegetation. Satellite imagery has revealed that from 1985 to 2021, deforested area has increased from 4,90,000 sq. km. to 12,50,000 sq. km. With 19 per cent of its rainforest destroyed on account of cattle ranching expansion and road construction, Brazil has caused the most destruction of the Amazon biome. The report is a collaboration between Amazon Network of Georeferenced Socio-Environmental Information (Raisg) and MapBiomass. Raisg believes this enormous loss is irreversible. The Amazon spans eight countries – Brazil, Bolivia, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela, and the French overseas territory of French Guiana. The 1.4 billion acres of forest contains half of Earth's tropical forests.

PUBLIC DOMAIN/NIEL PALMERCIA/T



An aerial view of the Amazon rainforest near Manaus in Brazil shows extensive deforested patches. Brazil has lost 19 per cent of the Amazon, an irreversible loss of enormous biodiversity.

PUBLIC DOMAIN/PETER PROKOSCH



*Hippopotamus have prominent foot-long canines, which are not used for chewing food but to fend off rival males or for self defence against predators. The increased trade in hippopotamus teeth may sound the death knell for this vulnerable species.*

## HIPPO TEETH REPLACE TUSKS

The almost-complete ban on elephant ivory has thrown up a new threat – trade of hippopotamus teeth. Born Free, a U.K.-based animal welfare charity, found that after ivory was banned in three online marketplaces, there was a surge in hippo ivory trade in the U.K. This is a dangerous trend as the hippo population in the wild is already on the decline. The hippo's lower canine teeth are used for similar purposes such as decorative carvings. They are cheaper and easier to obtain, but harder to carve. International sales of hippo parts are allowed under CITES with permits. Between 1975 and 2017, 770,000 kg. of hippo teeth were legally traded; this figure does not even account for the illegal trade. The mammal's teeth were the most seized body parts in the EU in 2020.

## WAR ON UKRAINE'S WILDLIFE

The Russian invasion and ensuing war in Ukraine has claimed thousands of lives, and the air, sea and land strikes are destroying the country's rich biodiversity and environment. With 74,000 species, Ukraine is home to a third of Europe's biodiversity. The government has documented over 2,200 cases of environmental damage because of the war. These include the death of 700 black sea dolphins, and the destruction of 6,00,000 hectares of forest, and 20 per cent of Protected Areas. Ukraine is widely contaminated with mines, a death sentence for animals. The environment minister Ruslan Strilets believes the actual damage is much greater, but will be uncovered after Russian occupation of those areas ends. The cost of pollution so far is pegged at 37.8 billion, including 11.9 billion of soil pollution. Ukraine wants Russia to pay these damages.

## STALEMATE OVER ANTARCTIC OCEAN

The Antarctic Ocean, also known as the Southern Ocean, continues to be susceptible to overfishing as the Commission for the Conservation of Antarctic Marine Living Resources failed to arrive at a consensus on creating three new Marine Protected Areas (MPAs) and fishing regulations for krill and toothfish. Russia and China, two among 27 member nations, blocked the proposal to create MPAs for the sixth year in a row at the meeting in Hobart, Australia, from October 24 to November 4, 2022. The Antarctic Treaty system requires 100 per cent consensus. India has supported MPA creation while expressing its desire to start krill fishing here. The silver lining was the recognition of eight new vulnerable marine ecosystems, where bottom fishing will be prohibited. The Southern Ocean is a haven for unique biodiversity.



## BIRDS OF MISTAKEN IDENTITIES

Pull out your lists, for there is an addition to the birds found in Arunachal Pradesh – the *Lisu* Wren Babbler! The bird was accidentally found in March 2022 by a team of six birders from Thiruvananthapuram, Bengaluru and Chennai, who were accompanied by two guides from Arunachal. The group was on Mugaphi peak in Changlang district in a remote northeastern part of the state, looking for the rare Grey-bellied Wren Babbler. After taking photos and videos of the bird and recording its song, the team tried to match it with information in different museums. When neither the song nor the plumage of the bird pulled a match, they realised they had documented a subspecies or a completely new species! They named the bird after the *Lisu* community that shares the habitat of this avian species.

## WILDLIFE PROTECTION ACT SLATED FOR CHANGE

Despite criticism from wildlife activists and the Opposition party on the need for a scientific approach, the *Wild Life (Protection) Amendment Bill* was passed by the Rajya Sabha during the winter session, on December 8, 2022. The Lok Sabha had approved it in August 2022. The Bill will bring changes to the *Wild Life (Protection) Act, 1972* to incorporate India's commitment as a party to CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) since 1976. Congress' Jairam Ramesh opposed the part that allows the transport of *elephants* for 'religious or any other purposes'. The Bill also gives the Centre the power to declare certain animals as 'vermin', which will expose them to culling and hunting; Some activists are also worried that marginalised communities will have to bear the four-fold increase of penalties for violations.

## WILDLIFE AND HUMAN TRAFFICKING GO HAND IN HAND

The apex anti-smuggling agency of India has found that routes used to smuggle wildlife and the ones used to traffic people, weapons and drugs are often the *same*. The Directorate of Revenue Intelligence's (DRI) annual *report*, released in December 2022, also says that porous borders with neighbouring countries such as China, Bangladesh and other Southeast Asian countries, along with the burgeoning aviation industry, makes controlling illegal trade a difficult task. Anonymity on the Internet, social media and the use of the dark net (an encrypted part of the Internet) further compound the problem. Despite these challenges, in 2021-22, India's Customs apparatus seized 4,762 Indian star tortoises, 145 MT red sanders and 77 exotic birds. DRI has seized elephant tusks/ivory worth Rs. 716.4 crore and red sanders worth Rs. 97.05 crore, among other items.



PUBLIC DOMAIN/MARK DANIELSON

*India is home to 18 of the 20 cities that had the most severe increase in PM2.5 between 2010 and 2019. Delhi was sixth and Kolkata was eighth on the list of cities with the most pollution-related deaths in 2019.*

## INDIA'S AIR QUALITY WORSENS

Don't ditch your masks just yet, because India has 18 of the 20 cities that had the most severe increase in PM2.5 (fine particulate pollutants) from 2010 to 2019. All the cities experienced an increase of  $30 \mu\text{g}/\text{m}^3$  in those years. The Health Effects Institute studied over 7,000 cities for the *report*. The World Health Organisation's annual PM2.5 Air Quality Guideline was  $5 \mu\text{g}/\text{m}^3$  in 2019. Meanwhile, the 20 cities that have seen the greatest decrease in PM2.5 in the same period are located in China. Prolonged exposure to fine particulate matter causes illnesses and also early death on account of diseases like lung cancer. The report found that Delhi with 106 deaths was sixth and Kolkata with 99 deaths was eighth on the list of highest number of deaths in 2019. Delhi with  $110 \mu\text{g}/\text{m}^3$  was at the top of the list of population-weighted annual average PM2.5 exposure in 2019.

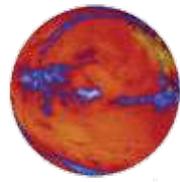
## BREAKING THE INDIAN BIRDING LANGUAGE BARRIER

Merlin, the bird identification app, developed by Cornell Lab of Ornithology, U.S.A., has launched the translation of information of 300 species in two Indian languages – Marathi and Malayalam. The app already has names of birds in six South Asian languages – Assamese, Bengali, Gujarati, Hindi, Odia, and Telugu. This has been possible on account of collaboration with Bird Count India, which has been working on adding bird identification descriptions in Indian regional languages. Bird Count India hopes to partner with more NGOs in different states to expand the translations.



PUBLIC DOMAIN/DAVID RAJU

*The Indian star tortoise faces habitat loss as well as genetic diversity loss. An attractive species, it is also in demand for its beautiful star-like patterned shell.*



# CLIMATE WATCH

## EXXON KNEW

While publicly denying and allegedly spreading misinformation about climate change, the multinational energy giant ExxonMobil internally created highly accurate projections of the impact of fossil fuels on climate change *four decades ago*. The largest U.S. oil and gas company projected that fossil fuel emissions would cause a 0.20°C of global warming every decade, with a margin of error of 0.04°C. Investigations had already revealed almost seven years ago that the company was aware about climate change since the 1970s, 11 years before it became a public issue. The then Chief Executive Officer of the company Rex Tillerson had said that climate models were “not competent” as late as 2013, and that “there are uncertainties” about how fossil fuels will affect the climate. However, the recently published research ‘Assessing ExxonMobil’s Global Warming Projections’ by the Potsdam Institute for Climate Impact Research and Harvard University shows how accurate the company’s predictions were. The lead analyst Geoffrey Supran observed that Exxon strategically remained silent while conducting their research, and spoke against the science when it started threatening their business. UN Secretary-General Antonio Guterres slammed ‘Big Oil’, saying it must be held accountable for their big lie.

## EXTREME WEATHER EXACTS HUMAN, FINANCIAL COSTS

The 10 costliest extreme weather events on account of climate change resulted in at least 168 billion USD in damages in 2022, revealed a [study](#) by Christian Aid. Topping the list was September’s tropical cyclone Hurricane Ian in Cuba and the U.S., which alone cost 100 billion USD. The second most expensive was the European drought from June to September, which cost 20 billion USD. Extreme weather events such as cyclones, droughts and floods have also killed

PUBLIC DOMAIN/MATT HKAC



*ExxonMobil knew of the dangers of global warming from at least the 1970s, and made accurate climate predictions, but chose to allegedly misinform and mislead the public.*

or displaced millions and caused environmental damages, more so in poorer countries, in 2022. The ‘biblical’ and devastating floods in Pakistan killed over 1,700, displaced a mind-boggling seven million people, and put 33 million at risk of health hazards. In a bid to protect communities from climate-induced disasters, the U.S. has issued its first federal grant for relocation. The grant, worth 75 million USD, was given to three Native American tribes. Each will receive 25 billion USD to relocate inland, away from the rising seas.

## ACCELERATING THE SWITCH TO RENEWABLES

The world is looking to add as much renewable energy in the next five years as it did in the last 20 years. The global energy crisis, fuelled by energy security concerns after Russia invaded Ukraine, has triggered this haste to turn to sources such as wind and solar. The [report](#), put together by the International Energy Agency, observed that the total global capacity for growth in this sector will double in the next five years, overtaking coal as the largest electricity generation source by early 2025. The growth forecast right now is 30 per cent higher than it was just a year ago. China, United States and India are driving the growth through policy changes and regulatory and market reforms. India, meanwhile, is expected to double its renewable energy capacity over 2022-2027. It also aims to have 500 gigawatts (GW) of non-fossil installed capacity by 2030, and by 2070, to achieve Net Zero emissions.

## ON SHAKY GROUND

A deeper look at the increasing trend of extreme weather events such as mudslides and flash floods in the Himalaya would offer more answers to the unfolding disaster in Uttarakhand’s Joshimath and surrounding areas that have been sinking at the rate of 6.5 cm. per year. Many areas in the Himalaya have been seeing glacial retreat and amplified warming, estimated at 0.5 °C increase each decade. The receding glaciers leave behind large amounts of sediment that can result in grave disasters during high rainfall events. Despite this, the government plans to harness 27,000 megawatts of potential hydropower from Himalayan rivers by constructing 450 projects, of which nearly 22 are planned in paraglacial zones (where glaciers have retreated) at elevations of 3,000 m., 44 are between paraglacial and winter snow line zones; and 54 are in the winter snow line zone. The combination of weak Himalayan terrain, developmental and infrastructure projects, uncontrolled tourism, and lack of proper drainage is laying the groundwork for more Joshimaths in the future.

PUBLIC DOMAIN/THOMAS LLOYD GROUP



*The global energy crisis, fuelled by energy security concerns after Russia invaded Ukraine, has triggered the haste to turn to sources such as wind and solar.*



# CAN WE COPE WITH THE NEW CLIMATE EXTREMES ?

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Melting glaciers. Rising oceans.*

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# Cloaked in the Power of Invisibility

*Invisibility is high on the list of superpowers that humans dream of possessing. Our legends, myths and stories reveal this long-held desire; they are replete with characters that have acquired, or are innately endowed with the ability to turn invisible at will. As always, nature is two steps ahead of us! Several creatures can either use camouflage to merge with their surroundings, or mimic other things, living or non-living to appear almost invisible in plain sight. Over time, evolution then fine-tunes these adaptations, passing each useful trait to the next generation. On the following pages, you will see leopards, spiders, owls, even animals that live under water, using illusion and disguise to avoid detection, to hunt, or to hide!*

An Indian Scops Owl *Otus bakkamoena* sits meditatively, seemingly growing out of the tree bole. Its small size (23–25 cm.) and textured brown body help it blend in with tree barks and hollows where it perches or roosts. Here, it can be identified by its prominent ear tufts, also by its frog-like calls to those who recognise the sound. This nocturnal raptor is found in India, Pakistan, Sri Lanka, Nepal and Iran.



The Western Ghats come alive when the monsoon arrives. It's a magical time, with life sprouting from every millimetre of space. The vine snake *Ahaetulla nasuta* not only looks like a vine, but also sways and creeps towards its prey, almost perfectly emulating a vine swaying in the wind.



Blink and you might miss the bright yellow, penetrating eyes of a Short-eared Owl *Asio flammeus*, camouflaged behind a stand of dried grass on the outskirts of metropolitan Navi Mumbai. Its straw coloured, mottled plumage helps break the shape of its body, allowing it to blend seamlessly with grass and rock.



GIRISH GOWDA

Look again! What appears to be a bunch of leaves with a tender green leaf in the centre is... *ta-dal* a walking leaf insect! Belonging to the family Phylliidae, these master camouflage artists possess large forewings, or elytra, shaped like leaves. Incredibly, these predators of the insect world even display a mid-rib and markings that resemble leaf spots and holes commonly seen on diseased or damaged leaves.

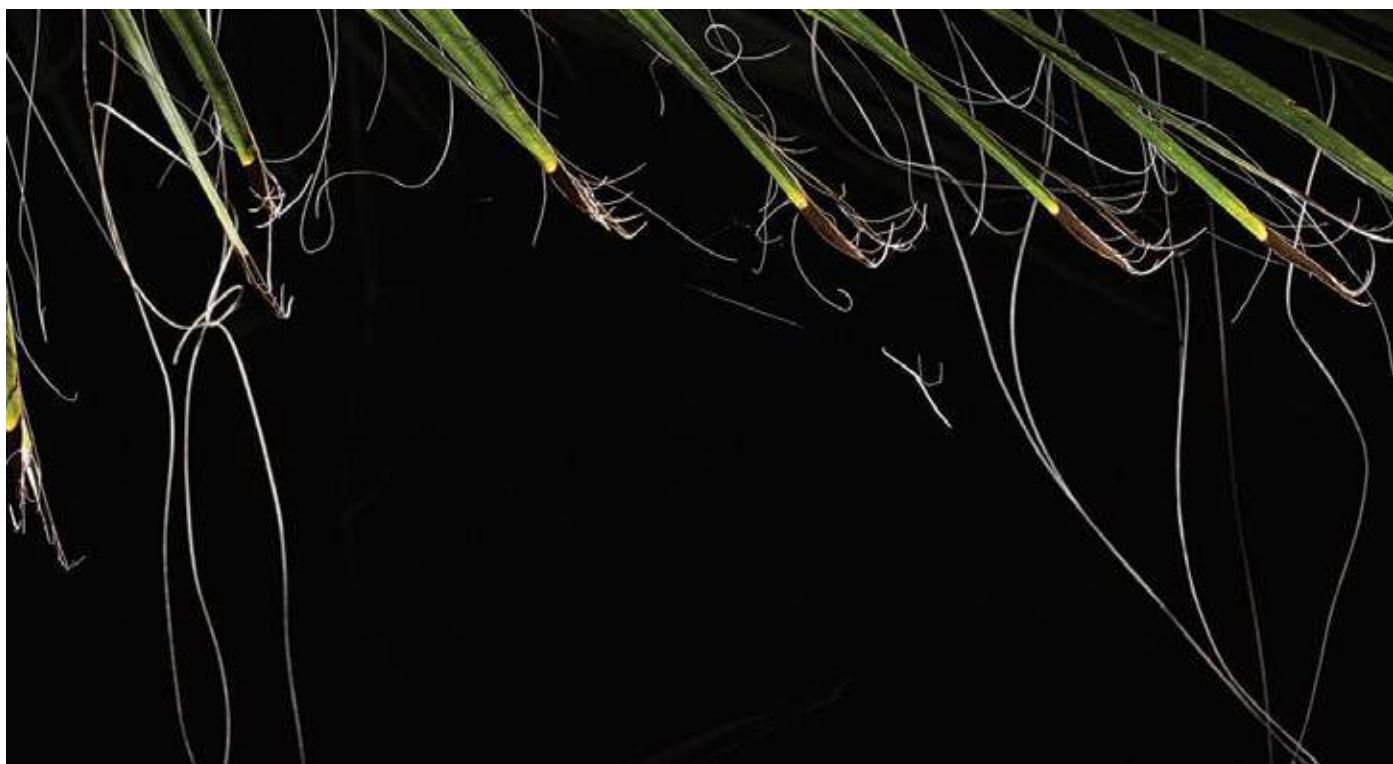


NILESH SHAH

Dead centre in the frame but near imperceptible, a common leopard *Panthera pardus* – one of the most elusive yet adaptable predators – surveys its world from amidst the rocks. These lithe felines are adapted to different habitats, and manage to live in pockets of wilderness even in urban areas of cities such as Mumbai, Bengaluru, Delhi, Nagpur, Guwahati and more. In habitats such as the dense forests of the Western Ghats, Central India, the Himalaya and the Northeast they flourish, by giving way to tigers – their more powerful cousin the tiger. This exquisite cat was photographed in broad daylight in Jawai, Rajasthan.



This two-centimetre-long Denise's pygmy seahorse *Hippocampus denise*, is a recently-described species of fish, found in Gili Meno, Indonesia! Using adaptive camouflage, it can change its colour to match the gorgonian coral on which it spends its entire life. Incredibly, this male is pregnant, evident from his bulging belly. Seahorse males may glue the female's eggs. Some go through a full male pregnancy, by transferring nutrients and oxygen to their young using a placenta-like system. A plankton feeder, it is tough to spot or photograph it thanks to its near-perfect disguise and minuscule size.



APURV JADHAV

The dried fibres of a grass blade swing in the wind, and with the threads sways a thread-like spider species (*Ariamnes* sp.) belonging to the Theridiidae family. Spiders are fascinating creatures, adapted to a plethora of habitats, and found in various sizes, shapes and colours. As the image reveals, spiders from the genus *Ariamnes* have greatly elongated abdomens that resemble threads or twigs.



MANDAR GHIMARE

With great camouflage comes the imperative of using camouflage well – cryptic colouration coupled with cryptic behaviour. This stick insect has somehow evolved the ability to *behave* like a stick! It stays motionless to merge with its surrounds, thus evading predators, while waiting for an opportunity to snap up potential prey.





Imagine you are a predator, a lizard or a bird in the Western Ghats, chasing a juicy, flashing blue butterfly when, like magic, it disappears from plain sight! This blue oakleaf butterfly *Kallima horsfieldii* achieved its miraculous escape by descending onto dry creeper, folding its wings and hiding its brilliantly-coloured dorsal side to display only the underside of its oakleaf-patterned hindwings. Voila! It now perfectly resembles a leaf, complete with midrib and 'fake' fungal patches, to blend in with the tree.



RAKESH JADHAV

Some species, like this bark katydid from the Tettigoniidae family, use cryptic colouration to blend in with tree barks. Cryptic colouration helps break up the outline of its body, making it difficult for predators (or photographers!) to distinguish the animal from its chosen background.



An elaborately laid pile of sticks, or a caterpillar? You decide! Belonging to family Psychidae, bagworm moth caterpillars are able to construct cases out of silk and collected material including sand, soil, lichen, and plants. Just another predator-evasion strategy gifted by eons of evolutionary adaptation.



Careful where you plant your feet in the leaf litter of the forests of the Western Ghats, for there lie barely visible, beautifully camouflaged, hump-nosed pit-vipers *Hypnale hypnale*. Earlier believed to be mildly venomous to humans, recent studies confirm that unless treated within a few hours, their bites could prove to be fatal.

GIRISH GOWDA



We saved the best for the last with this fantastically camouflaged lichen spider (*Pandercetes* sps.). The cryptic pattern on these spiders matches the moss and lichen on trees where they are usually found. Their legs have lateral hair, giving them a feathery appearance by breaking the outline of their bodies.

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# PLANET EARTH IN DANGER

## Promises made... and broken

Young people must never give up. Their elders, who seem incapable of real change, must see the writing on the wall and know that history will not remember them well. Before reading any further, *Sanctuary* recommends that our readers listen to Al Gore, speaking to those in the driver's seats at The World Economic Forum held between January 16 and 20, 2023 at the Swiss town of Davos. Like Greta Thunberg, he speaks truth to power and heaven knows this is a time for truth-telling in the chambers of power, where much of the fate of the planet lies in the hands of those who continue to place profit over the survival of life on Earth... people who have profited from turning Earth's atmosphere and its life-giving ecosystems into sewers. People who, for decades, have neither prioritised people, nor our magical planet.

Listen to what Al Gore has to say on the carbon cowboys who control the oil, coal and gas industries and more: [We Have the Tech to Slow Climate Change – So Where's Political Will, asks Al Gore](#)

Read what Shailendra Yashwant, one of India's finest environmental journalists, writes in the *Deccan Herald* about what he wants from Budget 2023. He asks that India's policy makers desist from inflicting illogical budget cuts on the protection of India's splendid and vanishing biodiversity. He points out the importance of the protection of our biodiversity, which is crucial for India's ecosystems and directly contributes to providing livelihoods: [Budget 2023 | No more illogical cuts; allocate more for biodiversity conservation | Deccan Herald](#)

# GLOBAL COMMITMENT FOR PROTECTING PEOPLE AND THE PLANET

By Vishaish Uppal and Aparna K.

The world created a landmark moment in December 2022 when nations agreed on the global decadal framework for biodiversity conservation, which has galvanised political commitment by all countries to halt and reverse nature loss by 2030.

This agreement comes under the ambit of the Convention on Biological Diversity (CBD), an international treaty adopted in 1992 at the Rio Summit, which provides a global legal framework for action on biodiversity. The convention has been ratified by 196 countries barring the U.S. and Holy See (the Vatican). The main pillars of the convention are:

- Conservation of biodiversity
- Sustainable use of its components, and
- The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

## A Delayed Convention

The Conference of Parties (COP) 15, scheduled to be held in Kunming in 2020, was finally held in Montreal in 2022, where negotiators gave shape to the Kunming-Montreal Global Biodiversity Framework (GBF). Though this framework was delayed by two years, it is ambitious and includes key elements that will hopefully contribute toward achieving Sustainable Development Goals, address the climate emergency and also provide substantial benefits to people.

The reasons for the failure of achieving the Aichi Targets, the last strategic plan (2011-2020) adopted in 2010, were widely understood. This agreement was developed based on the lessons learnt and by adopting an inclusive and transparent process keeping in mind that a strong implementation framework and enhanced resources are required for successful implementation.

Procedurally, COP15 was held in two parts on account of the COVID19 pandemic: COP15.1 was held in Kunming in October 2020 in a hybrid form, which resulted in the adoption of the 'Kunming Declaration',

where Parties reaffirmed their commitment to uphold the components of CBD and called for urgent action to reflect biodiversity considerations in all sectors of the global economy; COP15.2 was held in Montreal in December 2022, which was a physical meeting and had over 17,000 delegates from 196 countries, as well as the UN, civil society, Indigenous people and local communities, youth, women, academicians as well as the private sector. COP15.2, along with the concurrent Meeting of Parties (MOPs) on the two protocols under COP – Cartagena Protocol on Biosafety and the Nagoya Protocol on Access and Benefit Sharing, adopted over 50 decisions on multiple topics such as marine and coastal biodiversity, invasive alien species, biodiversity, and health and synthetic biology. The COP also adopted the gender plan of action, asking parties to support advancing gender mainstreaming and gender responsive GBF implementation, and was welcomed by all, especially women's groups.

## The Negotiating Pathway

Even though the GBF was adopted in Montreal after lengthy deliberations, which

continued until midnight and beyond, the process to develop a robust post-2020 GBF began immediately after COP14 in 2018, which adopted a decision for the same. An open-ended working group was established, which was tasked with drafting the GBF and steering Parties and stakeholders towards consensus building. A total of five meetings were held and there were tough negotiations, which delivered the final draft with text in brackets (over 1,000 brackets) to the COP for final deliberation, consensus and adoption.

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**FACING PAGE** The thick bamboo, oak and rhododendron forests of the Singalila National Park, in West Bengal. Forests such as this are our true natural assets that must not be lost to short-term economic gains that accelerate climate change while depleting the availability of fresh water and eroding the ability of our soils to feed our people.

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**BELOW** Much of Northeast India has lost its forests to jhum or shifting cultivation that involves clearing of land and cultivating it for a short period, until the soil is depleted, and then abandoning it and clearing more land. In this high-rainfall region, with topsoil being eroded heavily, continued jhum cultivation will eventually lead to complete desertification.



PUBLIC DOMAIN/JOLI BORAH



ABOVE The 15<sup>th</sup> meeting of the Conference of the Parties to the UN Convention on Biological Diversity (CBD), took place in Montreal, Canada, from December 7-19, 2022. The biggest biodiversity conference in a decade, it offered a glimmer of hope with countries striking a historic deal on protecting and restoring nature.

The GBF mission to take urgent action to halt and reverse biodiversity loss to put nature on a path to recovery by 2030 is essential to achieve the 2050 vision of living in harmony with nature by ensuring that biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people. In the face of accelerating biodiversity loss, the GBF's agreed mission is ambitious and is an equivalent of the 1.5°C climate change target of the Paris Agreement.

The mission hopes to be achieved through four overarching 2050 goals:

- Goal A – conservation of ecosystems, species and genetic diversity;
- Goal B – sustainable use and management of biodiversity;
- Goal C – benefits from the utilisation of genetic resources and Digital

## INDIA AT COP15

By J. Justin Mohan

Ahead of COP15, the Ministry of Environment, Forest and Climate Change (MoEFCC) had conducted a series of meetings with line departments to ascertain their views on the Post 2020 Global Biodiversity Framework (GBF), which was finalised by the CBD

for adoption at the COP. The National Biodiversity Authority, the principal advisor to the Government on biodiversity related matters, had provided the required inputs to MoEFCC. The Indian delegation, which was headed by the Union Minister for Environment, Forest and Climate

Change Bhupender Yadav, had prepared India's position on various issues, which were brought as an agenda for discussion on the GBF, Nagoya Protocol and Cartagena Protocol.

During the meetings of the Working Groups, Contact Groups and Friends of Chair, we had articulated India's position on various issues and many of our suggestions including bringing Digital Sequence Information under the benefit sharing mechanism, adopting Ecosystem Based Approaches for biodiversity conservation and reducing wasteful consumption, as propounded by our Prime Minister under the Life Mission, were incorporated in the text of the GBF. The proposal of the High Ambition Coalition, to which India is also a party, to bring 30 per cent of land and 30 per cent sea under conservation was also included as a target under the GBF.

During COP15, we informed the world community about India's achievements in biodiversity conservation at different side events organised by

LEFT The Indian delegation met with delegates from Turkey, which will be hosting COP16 in 2024. India called for an urgent need for a dedicated fund to help developing countries implement the global framework to halt and reverse biodiversity loss.



Sequence Information from genetic resources; and

#### Goal D – means of implementation.

These are supported by 23 targets, which are categorised as reducing threats to biodiversity (targets 1-8), meeting people's needs through sustainable use and benefit-sharing (targets 9-13), and tools and solutions for implementation and mainstreaming (targets 14-23).

### Ambitious and Robust Targets

Reducing threats and scaling up actions for conservation of habitats and species is the need of the hour. The science is clear that to maintain the resilience of biodiversity and ecosystem services and species conservation, the key is to conserve at least 30 per cent of land, inland waters and oceans globally, which is an important Target 3 of the Framework. It is crucial to

note that the target ensures recognition of the contribution of Indigenous and traditional territories as well as other effective area-based conservation measures towards its achievement. This has almost doubled the ambition since currently only 17 per cent of land and roughly eight per cent of marine areas are under protection. The GBF through its other targets has also recognised the importance of restoration of at least 30 per cent of degraded terrestrial ecosystems, inland waters, and coastal and marine ecosystems. The call for urgent management actions to halt human induced extinction of known threatened species and for the recovery and conservation of species as well as reducing to near zero the loss of areas of high biodiversity importance and high ecological integrity is required to be taken up urgently and effectively if we want to halt and reverse nature loss by 2030.

WWF, Asian Development Bank, UNDP, UNEP, GBYN and other reputed INGOs. I shared letters sent by school students in India from the CEO of Reserva: The Youth Land Trustt, which had mobilised one million letters from students around different countries addressed to world leaders on their ideas for better biodiversity conservation.

Now that we have the GBF in place with four goals and 23 targets, India will have to finalise the National Biodiversity Strategy and Action Plan (NBSAP), aligning our programmes in different sectors towards the goals and targets of the GBF. Given the monitoring framework in place, India will have to report on its activities to implement the GBF.

India has been implementing the Biodiversity Finance Programme with the UNDP since 2015, to identify financial requirements for biodiversity conservation and the scope for mobilising financial support for biodiversity conservation initiatives. Many of our initiatives such as mainstreaming of schemes towards

**RIGHT** The Final Plenary session in progress at COP15 in Montreal, Canada. While committing to biodiversity protection, India did not agree to numerical targets in pesticide reduction citing agriculture as a key economic driver.

### Limitations of the GBF

The GBF does fall short on addressing the major drivers of biodiversity loss – the increasing production and consumption footprint. A transformative and inclusive approach is required to deliver a just transition in the productive sectors. The framework urges for a substantial increase in the application of biodiversity-friendly practices, such as sustainable intensification, agroecological and other innovative approaches applied to areas under agriculture, forestry, fisheries and aquaculture, but it does not emphasise enough the need to reduce footprints across all sectors. The targets also mention important elements of footprint reduction such as halving the risk of pesticide use, halving food waste and reducing overconsumption, and it asks for full integration of biodiversity and its multiple values into policies, regulations,

biodiversity conservation, mobilising funds from corporates through the Access and Benefit Sharing (ABS) mechanism and Corporate Social Responsibility (CSR), besides designing a logo for ABS compliant companies to place the same on their products were applauded by other countries at COP15.

The Global Biodiversity Framework will be the foundation for biodiversity conservation in 196 countries until 2030, and since there are quantitative numbers assigned for each target and a

monitoring framework in place along with a recognition for mobilisation of resources for biodiversity conservation in the framework, this will go a long way to conserve our biodiversity and mitigate climate change so that humanity can live in harmony with nature in the coming years.

**J. Justin Mohan**, IFS, was a COP15 Delegate from India and is the Former Secretary of the National Biodiversity Authority.



planning and development processes. However, the agreement could have laid more emphasis on addressing the drivers of biodiversity loss.

## Other Elements of the Agreement

For the first time, COP15 adopted a stand-alone target on gender equality as well as strong language on rights to land and resources of Indigenous people and local communities. It also included the protection of Environmental Human Rights Defenders in the global agreement to protect nature (see below and page 30).

Another contentious issue, which polarised developing and developed countries and was a subject of intense negotiations was the Digital Sequence Information (DSI) on genetic resources. Debates around genetic resources and DSI were among the most fraught at

open-ended working group meetings and it was expected to be a key determining factor for achieving a deal in Montreal. In a historic decision at COP15, Parties finally agreed to integrate the fair and equitable sharing of benefits from the use of DSI linked to genetic resources in Goal C and Target 13. The Goal and Target state that benefit sharing from use of genetic resources needs to be substantially enhanced. In a separate decision, the parties also agreed to develop a multilateral solution for benefit-sharing for DSI. However, there is much work that Parties need to do regarding modalities for benefits sharing (monetary and non-monetary) from use of DSI on genetic resources, including deciding on who will govern the fund, how the benefits will be distributed, who will contribute to the fund, trigger points for benefits sharing, etc.

A strong and effective implementation mechanism, which is transparent and allows for an assessment of national actions towards delivery of the goals and targets, is essential to avoid a repetition of the failure to meet the Aichi Targets. The framework as well as the separate decision on “mechanisms for planning, monitoring, reporting and review” has laid out the details for how the framework should be implemented, and provides guidance to Parties on how to revise their national biodiversity action plans and the national reports. The adoption of the monitoring framework, which includes headline indicators, as well as component and complementary indicators for use in national biodiversity strategies and action plans by Parties, while also aiding the global reviews, will enable effective implementation and is a big and positive step, which will hopefully enable robust

# THE PATH TO A NATURE-POSITIVE FUTURE – INDIGENOUS REPRESENTATION

By Rituraj Phukan

RITURAJ PHUKAN



The much-anticipated ‘Paris moment for biodiversity’ happened after four years of consultations, although the outcome left vital questions around financial pledges pending. The Kunming-Montreal Global Biodiversity Framework (GBF) has four global goals and 23 targets to halt and reverse biodiversity loss by 2030, besides other measures to protect vital ecosystems, but negotiators failed to reach consensus on the draft biodiversity and climate change decision.

During the deliberations, Indigenous leaders feared for their rights under the emerging global biodiversity governance, apprehensive that the 30-by-30 target could be used as a tool to take away their land under the guise of conservation. The Indigenous communities-led Primary Forest Alliance has demanded a moratorium on industrial development in primary forests across the globe.

Target 22 of the GBF will “Ensure the full, equitable, inclusive, effective and gender-responsive representation and participation in decision-making, and access to justice and information related to biodiversity by Indigenous peoples and

*LEFT Opening Plenary at COP15. While COP15 has produced a truly ambitious final agreement, it is not legally binding. However, a monitoring framework has been set up for governments to show their progress.*

and comprehensive monitoring at global and national levels.

## Financing Implementation of the Agreement

Parties from the south have been very vocal in demanding enhanced finances/resources for effective implementation of the GBF. This was the elephant in the room and demanded patience and perseverance of all Parties. There was a clear recognition that unless adequate resources are made available, the framework will also fail like the Aichi Targets. After much discussion and debate on how to leverage the necessary finance from all sources, the target of mobilising at least 200 billion USD/year by 2030 from all domestic and international sources – both public and private, was agreed upon. This also includes the

international financial flows of at least 30 billion USD/year by 2030 from developed to developing countries. The need for strengthening capacity-building, access to and transfer of technology, and promotion of access to innovation and technical and scientific cooperation was a key component and an ask of developing countries.

In addition, Parties committed to reduce, repurpose or eliminate subsidies harmful to nature. The target clearly mentions that the negative incentives would also be substantially and progressively reduced by at least 500 billion USD/year by 2030, while scaling up the positive incentives for nature. This also was a contentious target as few developed countries were initially opposed to the target but then finally agreed.

A positive step was to request the Global Environment Facility to establish a Special Trust Fund in 2023 to support

the implementation of the Framework and complement existing support and scale up financing for timely implementation and flow of funds will also help the roll out of GBF at the national level.

## Developing Country Concerns Addressed, But Gaps Remain

Concerns of Parties from Asia, especially South Asia, such as ecological connectivity, addressing human-wildlife conflict, mitigating climate impacts and meeting people's needs have been addressed in the Framework. Regions like Africa and Latin America managed to often negotiate as a block, which was a good strategy. However, the Asia Pacific region was an exception with developed countries like Japan, small island countries like Maldives and developing countries like India, all of which have very diverse needs

local communities, respecting their cultures and their rights over lands, territories, resources, and traditional knowledge, as well as by women and girls, children and youth, and persons with disabilities and ensure the full protection of environmental human rights defenders."

Delegates further agreed that the UN Biodiversity Secretariat, with relevant organisations, will enable Indigenous peoples and local communities (IPLCs) to record, document, and transmit traditional knowledge with their free, prior, and informed consent. Further, the GBF has requested Parties to consider gender equality, intergenerational equity, human rights and the rights of Indigenous peoples and local communities, across implementation of biodiversity actions.

The Sustainable Critical Minerals Alliance launched at COP15 agreed to support local and Indigenous communities by respecting their respective rights and interests through engagement; promoting safe working conditions and responsible labour standards, diverse and inclusive workforces, supporting safe living conditions; and including members of Indigenous and local communities in

economic benefits from mining that affects their well-being.

Yet, the lack of consensus on the draft biodiversity and climate change decision that forced Parties to instead adopt a procedural decision, after countries of the global north persisted with nature-based solutions, which are seen as corporate-backed false solutions by some stakeholders, shows there is still a long way to go to overhaul the systematic exploitation of people and nature despite the critical need for convergence

of efforts to stop runaway climate change, biodiversity loss and catastrophic ecosystems for human safety.

**Rituraj Phukan** is an Assam-based writer, adventurer, and naturalist working on conservation and climate action projects across the world. He is the Founder of Indigenous People's Climate Justice Forum, the National Coordinator for Biodiversity with Climate Reality India and a member of the IUCN.



**RIGHT** On March 2, 2014, climate justice activists marched to the White House in Washington DC to oppose the Keystone XL pipeline. After a decade of grassroots pressure, President Biden finally revoked a key permit for the pipeline in 2021.

PUBLIC DOMAIN/STEPHEN MELKISETHIAN

and ambitions. Perhaps, the time has come for sub regions like South Asia to come together for crucial issues and negotiate as a block.

The issues highlighted above are by no means exhaustive. There are some targets, which will be difficult to measure and do not have the required ambition, but we hope that all countries and other

players will internalise the urgency of halting and reversing nature loss and deliver these commitments.

## Nature Now Has a Fighting Chance

The Kunming-Montreal GBF is critical as it provides a package deal and acknowledges the fact that protecting

nature needs concerted efforts from all stakeholders. It has recognised the role of all stakeholders especially Indigenous peoples and local communities, women and the private sector for nature conservation. It promises a much stronger means of implementation mechanism, aims to mobilise more funds to conserve nature, and has enhanced the sharing of benefits in

# WOMEN AND BIODIVERSITY AT COP15

By Shruti Ajit

As the Kunming-Montreal Global Biodiversity Framework (GBF) was adopted in the wee hours on December 18, 2022, it was a monumental moment for women and girls all over the world. For the first time within the biodiversity context, we have a stand-alone target on gender i.e., Target 23. With multiple discussions that spanned over two years, the target addressing tenurial rights of women, their full and effective participation and equal access to land and natural resources, aims to recognise the role of women and girls in the conservation and protection of biodiversity.

Along with the GBF, the Gender Plan of Action (GPA) was also adopted. Mainstreaming gender within the CBD was first discussed in 2008, after which the first GPA 2015-2020 was finalised. However, during a review in 2018, it was found that there has been a gap in the implementation of the GPA or having a

gender responsive approach within the national context through the National Biodiversity Strategies and Action Plans (NBSAPs). It was recommended to address the gaps within the GBF. The GPA, now seen in consonance with Target 23, will also ensure that gender considerations are not just limited to one aspect of the overall framework and will urge Parties to address gender gaps within the larger context of biodiversity conservation, which includes resource mobilisation for building capacities of women and girls, financial mechanisms such as gender budgeting, gender disaggregated data, etc.

India's 6<sup>th</sup> National Report on the implementation of NBSAPs outlines gender mainstreaming through measures such as ensuring reservations of a third of the seats for women in key decision-making institutions at various levels with some states increasing this to 50 per cent

(for e.g. BMCs). Gender Budgeting has also been institutionalised within 13 states so far. There has also been work done to build capacities and awareness of women, youth and local communities. However, we have a long way to go until the role of women and girls is adequately addressed. This includes tenure rights for women to be included in laws and policies related to land rights and tenure, more qualitative documentation of the role of women within biodiversity conservation and publicly available gender disaggregated data that allows for experts and the public especially women and girls, to effectively intervene within the larger implementation of NBSAPs.

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**Shruti Ajit** is the Programme Officer for Women4Biodiversity and has been working on documentation and advocacy around community based conservation initiatives and the role of women in conservation.



ABOVE LEFT AND RIGHT For the first time within the biodiversity context, the tenurial rights of women, their full and effective participation and equal access to land and natural resources, was included as a key target. This will ensure that the role of women and girls in the conservation and protection of biodiversity is recognised.

a fair and equitable manner from use of all forms of genetic resources.

The framework is not flawless, but it gives nature a fighting chance. All of us now need to transform it into actions, which can effectively implement the asks of the framework and rectify the relationship between people and planet. The time has come to give nature

a chance to enhance the free services it provides to humanity. We need to respect nature and learn to live in harmony with it.

**Vishaish Uppal** is Director, Governance, Law and Policy, WWF India; **Aparna K.** is Programme Officer, Governance, Law and Policy, WWF India.



**2020 UN BIODIVERSITY CONFERENCE**  
COP 15 / CP-MOP 10 / NP-MOP 4  
Ecological Civilization-Building a Shared Future for All Life on Earth  
KUNMING – MONTREAL

# YOUTH AT COP15

By Shruthi Kottillil



COURTESY SHRUTHI AJITH



COURTESY PAKHI DAS

ABOVE LEFT AND RIGHT CBD COP15 was an important milestone as five members of the India chapter of the Global Youth Biodiversity Network (GYBN, Indian Youth Biodiversity Network) were able to attend and participate.

India accounts for a fifth of the world's youth population ([Ministry of External Affairs, Government of India, 2021](#)) and yet in biodiversity conservation youth are rarely given a voice in decision making. This is crucial as biodiversity and nature conservation are areas where youth are actively engaged both in a professional and personal capacity. CBD COP15 was an important milestone as five members of the India chapter of the Global Youth Biodiversity Network (GYBN, Indian Youth Biodiversity Network) were able to attend with three also representing GYBN. Sudha Kottillil, Pakhi Das and I, now the coordinators of IYBN, organised an Indian Youth side event, where state coordinators presented their work, and actively engaged with the Indian delegation, who were appreciative and supportive of the youth action plans. Kolan Bharath

Reddy and Shruti Ajit, now in advisory roles and members, helped bring in state coordinators and partners who are doing effective on-ground work. The experience was exciting and overwhelming with several parallel events from negotiations, side events, and lobbying to advocacy. It was a privilege to be a part of such a historic moment as the Kunming-Montreal Global Biodiversity Framework (GBF) will replace the Aichi Targets.

Although the adoption garnered differing opinions, it was a landmark in that explicit references to youth, Indigenous Peoples and local communities, women, girls and children continue to remain in Target 22. This will go a long way in the implementation wherein youth are recognised as stakeholders and contributors to nature protection and conservation. This is further strengthened

by explicit references to protecting the human rights of environmental defenders.

With a new numeric now accepted for protecting and restoring 30 per cent of forests, inland/fresh coastal/marine waters, and degraded ecosystems, respectively, the spotlight will be on how effectively it is implemented. The only concern is that the numeric goal should not undermine the qualitative aspects of how it is going to be achieved. With the financial mechanism receiving backlash, we will have to wait and see how the implementation of the GBF progresses and what steps are taken during the intersessional meetings.

**Shruthi Kottillil** is a researcher and ecologist working on wildlife conservation. She is a member of GYBN and one of the coordinators of the India chapter, IYBN.



## The Sanctuary Interview

# Meet Dr. M. Monirul H. Khan

*Wildlife biologist **Dr. M. Monirul H. Khan** is celebrated across the world for his practical, determined defence of wild nature. His heart and head lie clearly with the people of Bangladesh, one of the most climate-threatened geographies in the world. Awards galore have come the way of this unique and effective defender of the biosphere, including the Bangabandhu Award for Wildlife Conservation (2015), a National Award presented by the Prime Minister of Bangladesh, plus a host of others, far too numerous to list. He is currently a professor in, and the Chairman of, the Department of Zoology, Jahangirnagar University in Bangladesh. He met **Bittu Sahgal** in Dhaka, where he conducted a session at the Balipara Foundation's 10<sup>th</sup> Eastern Himalayan Naturenomics™ Forum 2022.*

**M**onirul, today you are a voice for the planet not just in Bangladesh, but the whole world. Tell us a bit about your childhood and schooling? No matter how loud it is, one person's voice cannot go very far. If the

same voice, however, is echoed by others, it can reach the farthest corners of this world. Therefore, it is crucial that we all raise our voices so that the natural world can survive.

I was born in Tangail, central Bangladesh, in 1974. I am the youngest of six children; I grew up with many cousins and friends in the neighbourhood. I enjoyed my childhood doing various things but, honestly speaking, not studying much. My first school was not far from home, but I had to cross a river using a narrow bamboo bridge, which was challenging.

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*If Bangladesh and India want to ensure the long-term conservation of the Sundarban and its tigers, collaboration is not an option, it is a must because the Sundarban is one ecological unit shared by two countries*

**A**nd how did you wander into the wonderful world of nature conservation? When I was a child, the stories of my father's close encounters with tigers and other wild animals in the Madhupur forest in northern Tangail, when he was living there for his first job from 1949 to 1951, sparked my interest in wild animals. Moreover, the area I grew up in was surrounded by natural habitats, where I used to see wildlife. By the time I started college, I realised that Bangladesh's wildlife was vanishing rapidly and unless we took serious action, many of the charismatic wild animals, including the tiger, would soon be extirpated. I decided to do something to ensure their survival.

**A**nd the Sundarban? How did your life lead you towards studying and protecting this, the world's largest mangrove tiger habitat? I first visited the Sundarban in 1995 when I was studying zoology at Jahangirnagar University. I was amazed to see the vast wilderness (that still exists) in a densely populated country. The grazing herds of chital, colourful birds and fresh tiger pugmarks drew my attention. I decided

*'Human-wildlife coexistence' is catchy, but for tigers or any large wild carnivore, coexistence should be avoided as much as possible to avoid conflict, and there should be some buffer areas between the domains of large wildlife and humans.*

to devote myself to wildlife conservation, with a focus on the Sundarban – Earth's best mangrove wilderness.

#### **Y**our take on the Sundarban tiger's fabled reputation as a man-eater?

I know some people don't like the term 'man-eater', but we cannot avoid the fact that a few tigers in the Sundarban deliberately hunt and eat people. What is unique here is that even healthy tigers can turn into man-eaters. It is difficult to say how the man-eating behaviour originated, but I think tigers have learned to prey on humans as they might any other animal. 'Human-wildlife coexistence' is catchy, but for tigers or any large wild carnivore, coexistence should be avoided as much as possible to avoid conflict, and there should be some buffer areas between the domains of large wildlife and humans.

**FACING PAGE** Dr. Monirul Khan's doctorate thesis was on the ecology and conservation of the tiger in the Sundarban of Bangladesh.

**BELOW** Seen here with honey gatherers in the Sundarban, Dr. Khan has been working on human-wildlife conflict issues that arise when living close to large wild carnivore habitats.



COURTESY DR. MONIRUL KHAN



**ABOVE LEFT** Dr. Khan and his team crossing a creek in Supati, Sundarban. The Sundarban forests are one of the most impacted areas from climate change and it is vital to act now, says Dr. Khan.

**ABOVE RIGHT** Dr. Khan setting up a camera trap in the Sundarban mangrove forest. His work has been published in several scientific and popular journals and books.

**D**o you see any real hope that India and Bangladesh will work together with synchronicity regarding the management of the Sundarban? If Bangladesh and India want to ensure the long-term conservation of the Sundarban and its tigers, collaboration is not an option, it is a must. This is because the Sundarban is one ecological unit shared by two countries; anything good or bad in one area will affect the other. In 2011, the governments of Bangladesh and India signed a memorandum of understanding on the conservation of the Sundarban, and a protocol on the conservation of the tiger in this mangrove forest. In the light of these two documents, I hope the two countries will take necessary steps to strengthen the collaboration.

**W**hat is Bangladesh's gameplan to deal with the inevitable impact of the climate crisis, which will

deliver even more extreme and more frequent climatic events? Bangladesh, particularly the Sundarban region, is one of the most impacted areas of climate change, although the country's contribution to global warming is minimal. Bangladesh is committed to taking action and, with the formulation of Bangladesh Delta Plan 2100 and Mujib Climate Prosperity Plan, the country is on the right track to cope with the challenges of the climate crisis. Necessary funding from national and international sources, however, is crucial to implement these plans.

**A**re people living in the Bangladesh Sundarban aware of the risks from climate extremes?

There is no permanent human settlement in the Sundarban of Bangladesh, but there are villages, crop fields and shrimp farms along the northern boundary of the forest. The people are indeed living at the risk of climate extremes of various kinds, but they have nowhere to go. The climate extremes, however, would impact them more severely in the absence of the Sundarban forest, which serves as a natural barrier for cyclones.

**D**o you see northward migration being an inevitable

*Bangladesh is committed to taking action and the country is on the right track to cope with the challenges of the climate crisis. Necessary funding from national and international sources, however, is crucial to implement various plans.*



COURTESY DR. MONIRUL KHAN



**result of the climate crisis?** Yes. I think the best adaptive measure for the Sundarban and the people living along its northern boundary is a gradual northward migration. If we look at the geological history of the region, we will see that earlier, the migration of the Sundarban naturally took place to adjust with sea levels, which is not possible in the present context since the extreme human use of land will not allow mangrove vegetation to take over new lands towards the north.

**When we met in Dhaka at the Balipara Foundation's Eastern Himalaya event, we spoke about the need to get children involved in issues concerning biodiversity and climate change. Do you see any possibility of working towards this objective in the near future? Sanctuary would love to collaborate.** Today's children are tomorrow's adults. If we can make them aware of the issues of biodiversity and climate change, we will surely have a better future. We must keep in mind that unwise human activities are the key driving force that have led not only to the climate crisis, but also to the extinction of many species of animals

and plants. Sanctuary, in partnership with local organisations, can consider launching a transboundary awareness programme for the children living in the vicinity of the Sundarban.

**D**o you have a message for the children of Bangladesh... and India for that matter? Conservation is a relay race, so whatever we achieve will be carried forward by our next generation. Today's children are more aware of what is happening to the living world and, I believe, young leaders like Greta Thunberg will appear in South Asia and show us the way forward. The sacred land where Gautam Buddha – the greatest conservationist of all times – was born can give us modern day conservation champions. Each and every child has the potential to become one. I will be waiting to welcome them! 🐘

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ABOVE LEFT Dr. Khan and his family. His childhood interest in wildlife and nature blossomed into a deep commitment to protect his country's natural heritage.

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ABOVE RIGHT Dr. Khan training foresters in Katka, Sundarban East Wildlife Sanctuary, Bangladesh.

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*The sacred land where Gautam Buddha – the greatest conservationist of all times – was born, can give us modern day conservation champions. Each and every child has the potential to become one. I will be waiting to welcome them!*



# Ramki Sreenivasan

A Personal Tribute

**April 3, 1972 – December 19, 2022**

**By Bikram Grewal**

I was well into my middle years, having seen almost all the birds found in the Indian region, been to all the hotspots and written over 30 books, when I met Ramki. Despite the fact that almost two decades separated us, not to mention the physical miles that lay between us, we struck up a friendship that was to last two decades, right until his tragic death at such an early age.

When we met, Ramki was a successful entrepreneur and I, an aspiring writer. By then, he had also started to earn a reputation as a fearless photographer and traveller. I sought him out, unsure

of what to make of this eccentric man – a vegetarian who was very selective about his single malts. In December 2008, Ramki kindly invited me to join him on a trip to the Eaglenest Sanctuary in Arunachal Pradesh to try and spot the newly-discovered Bugun Liocichla *Liocichla bugunorum*, so off we went to the Northeastern state where, besides seeing several new birds, we also saw the rare golden cat. It was here that I first met [Shashank Dalvi](#), a boy so young that it would be some years before his chin would make contact with one of Mr. Gillette's inventions. The next five days

taught me that no matter how successful one thought one was, there was so much more to see and learn, and that one would forever be a novice.

A few weeks later I got a call from Ramki asking if his family (his wife Swarna, his parents and his brother), who

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*ABOVE After taking an early retirement in 2008, Ramki made extensive trips to wildlife destinations across India. By 2011, he became devoted to serious conservation issues and along with Shekar Dattari set up an online portal – Conservation India (CI).*



RAMKI SREENIVASAN



RAMKI SREENIVASAN/CONSERVATION INDIA

were coming to Delhi for a wedding, could all stay with us. What was to be a three-day visit turned into a three-week stay, as his father suffered a heart attack brought on by an over-indulgence of the local favourite, the *chola bbatura*. It was during these fretful days that I noticed an uncanny relationship grow between my spaniel Sylvester, called Silly for short, and the Sreenivasan couple, so much so that immediately on their return he called me rather shyly to ask if he could adopt the dog. And so, Silly became the third and most thoroughly spoilt member of this Bengaluru family. Albeit, the move from Delhi to Bengaluru involved a Jet Airways flight captain, a dog psychoanalyst, and not to mention, the Muddy Paws club. It would be fair to say that Silly and his human became fast friends, and his death preceded Ramki's demise by just a few months. The family was soon augmented by the addition of their son Shiva, a fine boy who will hopefully continue the work started by Ramki.

Ramki and I travelled across the country over the years, making several trips to Arunachal, Assam, Madhya Pradesh, Dandeli, Kabini and the Sundarban. We attended several bird fairs in Goa, Uttar Pradesh, Uttarakhand and Karnataka. Along the way, I wrote several new works illustrated with many excellent photographs by him. A trip I took with him to the Kingdom of Bhutan resulted in many lengthy articles on the birds there, including Black-necked Cranes.

A few years later, an invitation to Nagaland from my friend [Bano Haralu](#) effectively changed our life and the direction it was taking. I decided to ask Ramki, Sumit Sen and Shashank to join us as it was completely uncharted territory and we were unaware of both its geography and bird life. On the first trip in January 2010, Ramki single-handedly managed to photograph over a hundred birds, never captured on camera before in India. This included the Naga Wren Babbler, Chestnut-vented Nuthatch, Brown-capped Laughingthrush, the Spot-breasted Parrotbill and a horde of others, many of which I had only dreamt about.

That trip to Nagaland was also the start of a tremendous conservation effort. We had heard stories of the massacre of tens of thousands of [Amur Falcons](#). These diminutive birds of prey were being killed over a 10-day period during their migration via India, and sold for their flesh. We immediately set off to see this ghastly spectacle at the Doyang Reservoir, but the season was wrong. When we finally made it there a few months later in 2012, the extent of the indiscriminate hunting truly shocked us. Around 1,40,000 Amur Falcons were being hunted each year for their meat.

True to his style, Ramki took up the matter head-on. After a long and difficult fight, he and his colleagues managed to stop the killings and persuaded the hunters to become guides.

**ABOVE LEFT & RIGHT** Ramki Sreenivasan had a reputation of being a fearless wildlife photographer, the first in India to photo-document over 1,000 species. He was also at the forefront of conservation issues such as Amur Falcon hunting in Nagaland.

The conservation success earned him worldwide fame, and gave the Amur Falcon a new lease of life.

One of his other great achievements was the setting up of the famous [Conservation India](#), a platform of the best writers and photographers in the field of nature conservation. Conservation India also spearheaded an awareness campaign to protest the setting up of a radar installation by the Indian Coast Guard on Narcondam Island in the Andaman and [Nicobar](#) Island, which would have threatened endemic species such as the Narcondam Hornbill. He also started Wildlife for Cancer, through which he used the proceeds from his photographs to help young children suffering from cancer.

Needless to say, Ramki died too young, leaving behind unfinished work. I can only hope that others will pick up his baton and finish the battle he so fervently started. ♦

Ornithologist, publisher and conservationist, **Bikram Grewal** has authored several acclaimed books on birdlife in India and is particularly fascinated by forest birds.



# A MISPLACED SAFARI

Citizens living near the Aravallis ask for ecological restoration. Instead of a giant safari and zoo project, the Aravallis should have a giant protection zone, writes **Neha Sinha**.

In the world's oldest fold mountains, the government wants to build the world's largest safari. For years, residents from Haryana have been fighting to save the Aravallis from illegal mining, organised garbage dumping and real estate grabs. Now, the mountains must contend with an anachronistic plan to build a 10,000 acre

safari with underwater zones, coastal areas, an aquarium, and possibly, an enclosure with our latest crush, the *African cheetah*.

Residents of the area and the *Aravalli Bachao* Citizens Movement, behind decade-long fights for conserving the Aravalli mountain range, have one question: why here? They aren't questioning why a safari

should be made, but *where* it should be made. In a letter to the Haryana Chief Minister Manohar Lal Khattar and the Union Environment Minister Bhupender Yadav, sent on January 19, 2023, the group has called out the plan for what it is at this point – a commercialisation of the area, cloaked as a green project.



The intervention of making a zoo safari park in the Aravallis and creating a major tourist destination by making hotels, clubs, restaurants, auditoriums, entertainment parks and landscaped gardens, and laying of electricity lines and road networks, as mentioned in the list of mandatory requirements of structures in the Aravalli Safari Park outlined in the Haryana Tourism Department's May 2022 'Expression of Interest (EOI)' document, will result in the destruction of the native ecosystem by clearing of trees, undergrowth, vegetation, grasses, ponds and other such niche habitats used by the resident wildlife. This project will result in a lot of unnecessary construction and real estate development in this eco-sensitive area, which, along with an influx of visitors and tourists, will

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*ABOVE Citizens protest against the backdrop of a huge garbage landfill in Bandhwari, near Gurugram. The landfill sits on the Aravallis, leaching poisonous substances into the forest soil and water. The National Green Tribunal has recently imposed a fine of INR 100 crore on the Haryana government for continued ecological damage to the Aravallis and public health on account of mismanagement of the Bandhwari landfill. This mountain of toxic waste is now higher than the surrounding Aravalli hills.*

cause more damage to the already at-risk ecosystem that has been ravaged by illegal mining and other non-forest activities. It will further exacerbate problems of waste management. The Aravalli ecosystem needs to be conserved, not constructed upon, and left alone as a home for native wildlife and to serve the critical ecological functions it performs for India's highly polluted and water-stressed National Capital Region and south Haryana," says Neelam Ahluwalia,

Founder Member and Trustee, Aravalli Bachao Citizens Movement.

The zoo safari project, helmed by Haryana's Tourism Department, has revenue as its primary goal. A position paper by the Aravalli Bachao Citizens Movement and leading conservationists, sent to the government, points out:

"The May 2022 EOI document of the Haryana Tourism Department explicitly states that the aim of this project is to increase



**ABOVE** Residents of the area and the *Aravalli Bachao Citizens Movement* have been fighting consistently for a decade for the conservation of the Aravalli mountain range.

tourist footfall in the state and to increase government and private investment in the tourism sector. Conservation of the Aravallis does not even get a mention in the aims of the project. The primary purpose of any intervention in the eco-sensitive Aravallis must be 'conservation and restoration of the Aravallis', with any revenue generation activities being limited by guidelines of National Parks and Protected Forest Reserves."

The movement has a clear ask – to declare the 670 km. Aravalli range running across the four states of Delhi, Haryana, Rajasthan and Gujarat as a Biosphere Reserve, so that northwest India's climate regulator, shield against desertification, critical water recharge zone, pollution sink, biodiversity hotspot and wildlife habitat

can be protected for our future generations. They also ask for an independent study by ecologists and wildlife researchers on bird and animal life and their movement in the 10,000 acres of the Aravallis, to determine the best conservation plan for this extremely critical eco-sensitive area.

Making zoo enclosures will impede the movement of wildlife. Instead of bringing in exotic or foreign wildlife, the area, already degraded by illegal mining, should be restored and people should be taken to enjoy nature walks, forest immersion and native bird and wildlife watching.

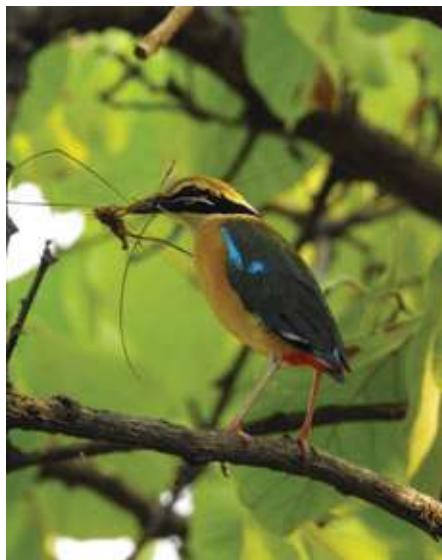
"What does the government plan to do with the native Aravalli wildlife that already exists in these 10,000 acres of land in Gurugram and Nuh districts, where the government is planning this zoo safari? Will the wild Aravalli species roaming in the Aravalli hills and forests be captured and put in the enclosures with the other zoo animals?" asks Jyoti Raghavan, Managing Trustee, Aravalli Bachao Citizens Movement.

*Ecologically, making a giant safari with retail spaces and commercial zones cannot be considered a 'forest activity'. Further, a plan that involves foreign wildlife at the cost of native wildlife should be immediately relooked.*

**A LONG BATTLE** The Aravallis seem cursed by their proximity to the national capital's development-at-all-cost hunger, but also blessed by a long citizen's movement that has worked hard to protect it, in the face of real estate and mining lobbies.

Once full of tigers (Sariska in Rajasthan was connected to other parts of the range), the Aravallis have been broken down for mining, eaten away by real estate and housing projects, and even used as a site for municipal garbage near Gurugram. In sum, they have been seen as everything but what they really are: a valuable heritage area, with location-specific plants and trees, and an ecosystem that still has tigers, leopards, hyenas, vultures and rivers.

This is a situation that is at once environmentally ruinous as well as a security threat. Keeping an eye out for and reporting on illegal mining can be dangerous. Yet, the Aravalli Bachao Citizens Movement has gone to court against illegal stone and sand mining that continues in the area. Others have approached court against massive real estate projects on forest land. Recently, the National Green Tribunal (NGT) constituted a joint committee to examine illegal mining in Gurugram, Nuh and Faridabad (incidentally, this overlaps with the area for the safari proposal). The committee found that illegal mining continues unabated in the area, and deep trenches were easily visible. Citizens



have collected photographic evidence of *entire* hills vanishing.

The NGT has now directed the Mining Department in Haryana to set up a control room and notify its mobile number and email ID so people can lodge complaints of illegal mining.

Yet, there are more problems facing the area. A huge garbage landfill in Bandhwari, near Gurugram, sits on the Aravallis, leaching poisonous substances into the forest soil and water. The NGT recently imposed a fine of INR 100 crore on the Haryana government for continued ecological damage to the Aravallis and public health due to mismanagement of the Bandhwari landfill. Sadly, this mountain of toxic waste is now higher than the surrounding Aravalli hills!

While our forests deserve restoration and stewardship, providing clean air, water and recreation, we also seem determined to turn them into our dirtiest places.

Within this official neglect, the zoo safari plan posits itself as one that is 'clean and green'. There have even been statements that trees will be planted at the spot to 'compensate' for the destructive transhipment project in Great Nicobar, which will destroy 130 sq. km. of forest. Clearly though, trees planted in a safari are not a replacement for tropical forest; a safari in this stated form is not a project that restores, conserves or helps native wildlife.

In the recent meeting of the Convention on Biological Diversity (see page 26), the majority of countries of the world have agreed to a new Global Biodiversity Framework. These are targets the world



must achieve in order to stabilise and protect biodiversity, even as climate change burns our lives. The most talked about goal is thirty by thirty. It is as follows:

*Ensure that at least 30 per cent globally of land areas and of sea areas, especially areas of particular importance for biodiversity and its contributions to people, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area based*

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**TOP LEFT AND RIGHT** The proposed zoo turns a blind eye towards the rich existing biodiversity of the Aravallis. Along with the Indian Paradise Flycatcher *Terpsiphone paradisi*, the Indian Pitta *Pitta brachyura* has been recorded nesting here. The taxonomic database *Avibase* shows a bird checklist of 343 species including the Indian Eagle-Owl *Bubo bengalensis*.

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**ABOVE RIGHT** A common leopard *Panthera pardus* darts across the frame in this camera trap image taken in Asola Bhatti, Delhi's only wildlife sanctuary.

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*The Aravalli Bachao Citizens Movement is asking for the declaration of the 670 km. Aravalli range in Delhi, Haryana, Rajasthan and Gujarat as a Biosphere Reserve, so that northwest India's biodiversity hotspot can be protected for future generations.*

# Immerse in Travel FOR GOOD

A photograph of three people standing in a lush green forest. One person on the left is pointing upwards towards the sky. All three are looking upwards with expressions of awe or admiration. The forest floor is covered in tall, dry grass.

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*conservation measures, and integrated into the wider landscapes and seascapes.*

The government wants a zoo or a safari to be interpreted as an activity that's allowed in a forest. But on July 21, 2022, the Supreme Court held that land area covered under special orders of Section 4 of the *Punjab Land Preservation Act* (PLPA), which covers some of the Aravallis in Gurugram, be treated as 'Forest'. This means that the provisions of the *Forest Conservation Act* (FCA), 1980 should apply. As per FCA, activities like felling of trees and construction are considered as non-forest activities.

A safari is a non-site specific activity, and can be made anywhere. Ecologically, making a giant safari with retail spaces and commercial zones cannot be considered a 'forest activity'. Further, a plan that involves foreign wildlife at *the cost of* native wildlife should be immediately relooked.

The solution, conservationists and citizens say, is to create a robust ecological restoration plan for the 10,000 acres of Aravallis in Gurugram and Nuh, which can then be replicated in other Aravalli areas in Haryana. An example of this already exists in the 400 acres of the Aravalli Biodiversity Park, which has created forests, grasslands and scrublands on an area degraded by mining. Today the park is home to butterflies, birds, odonates and mammals, not to mention an active human community that cherishes the area for walks and nature watching.

## WILDLIFE IN ARAVALLIS – A LIVE CORRIDOR

A recent study of Asola Bhatti Wildlife Sanctuary, Delhi's only wildlife sanctuary, recorded incredible biodiversity. A year-long camera trapping exercise was carried out by the Forest Department, Government of National Capital Territory of Delhi, helped by Bombay Natural History Society's (BNHS) Delhi Conservation Education Centre. Asola is connected to the Aravalli forests in Haryana and is part of a functional wildlife corridor.

A grid-based stratified sampling method was used after a six-month long ground survey. The Sanctuary was divided into three blocks, with seven grids in each block of one square kilometre. Camera trap stations were set up in each grid with two cameras facing each other so that both flanks of an animal could be captured. The sampling duration for each block was 28 days, with a total of 84 days over the year. The results were incredible. More than 14,000 stills of different mammals were captured. Eight unique leopards were identified.

Apart from leopards, the other mammals that were recorded were striped hyena, jungle cat, golden jackal, Indian hare, Indian pig, nilgai, blackbuck, sambar, chital, hog deer, rhesus macaque, Indian crested porcupine, two species of civet – the small Indian and Asian palm, and three species of mongoose – ruddy, small Indian, and Indian grey. Also recorded on camera traps were domestic cats, dogs, cows, buffalos and goats. Asola probably has two to four striped hyena, the scavengers

**ABOVE** The Aravallis are an ancient fold mountain range. At 1,722 m. Guru Shikhar is the highest peak in Mount Abu. The Aravalli Range is arguably the oldest geological feature on Earth, having its origin in the Proterozoic era.

responsible for cleaning carcasses. On account of lack of clear photographs, the individual identification of hyenas was not possible.

The findings from this study should play an important role in designing management and conservation plans for Asola, keeping the leopard and other vulnerable species in mind. It also shows the potential that the Aravallis have as a wildlife refuge and habitat, if protected. Leopards, hyenas and other mammals use the larger landscape around Asola to disperse. This wildlife corridor must be restored.

A large part of the 10,000 acres identified for the Aravalli zoo safari park in Haryana harbours a rich diversity of native Aravalli wildlife including more species of mammals such as the northern plains langur, honey-badger, Indian fox, jungle cat, ruddy mongoose, leopards, striped hyenas and others, as brought out in a 2019 survey of the Aravalli forests of Gurugram and Faridabad, supported by WWF-India.

Yet, there is no designated national park or wildlife sanctuary just for protecting the Aravallis of Haryana at a landscape level, unlike the state of Rajasthan, which has protected the Aravalli mountains in the Sariska National Park. The demand for protecting Aravallis for their native wildlife is well-suited for the natural riches of the area. Is anyone listening? ▶

# THE EIGHT PASSAGE DEITIES OF **KUTCHH**



A close-up photograph of a thorny branch, likely from a scrubland plant, with sharp, light-colored spines against a dark green background.

By Ram Gopalakrishnan

We walked in single file across the scrubland. Our target was a small bird that you might pass off as an unremarkable robin anywhere else or at any other time of the year in India. But when the charismatic Rufous-tailed Scrub Robin *Cercotrichas galactotes* puffed its wings, cocked its long rufous tail and allowed us to approach incredibly close, cellphone cameras were almost as useful as bazooka lenses! A round of exultant high-fives followed.

Kutchh, located at the westernmost tip of India's westernmost state Gujarat, falls on the migratory route of several avian species flying from their breeding grounds in the tundra in central Asia and eastern Europe, to their wintering grounds in east and south Africa. The diversity of habitats of Kutchh – the Greater and Lesser Rann of Kutchh and Banni Grasslands, attract these passage migrants that travel over the Central Asian flyway and Asia-Africa flyway. Among them are eight species that draw hordes of birders – European Roller, Red-backed and Red-tailed Shrike, Spotted Flycatcher, Rufous-tailed Scrub Robin, Greater Whitethroat, Common Cuckoo and Blue-cheeked Bee-eater. You could call them the eight passage deities of Kutchh... you can get their blessings only for a short period between mid-August and mid-October, when they make a pit stop on their annual migratory passage through Kutchh.

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LEFT The Rufous-tailed Scrub Robin *Cercotrichas galactotes*, along with seven other species, pass through Kutchh for a short period between mid-August and mid-October while migrating to their wintering grounds in Africa.



To reach Kutchh, you need to get to Bhuj by train or air and head west and northwest towards the Greater Rann and the Banni Grasslands in these months to seek their *darshan* (holy glimpse). Mandar Khadilkar of the tour company Nature India, and our Kutchh specialist birding guides Vikramsinh Sodha and Karthik Patel were (figuratively) the ‘priests’ who were to do the rituals.

Apart from the eight passage deities, our group of eight was also looking forward to receiving blessings from other migrants and residents such as the Eurasian Nightjar *Caprimulgus europaeus* and the Marbled Teal *Marmaronetta angustirostris*.

**A BIRDING HAVEN** The long, bright tail of the Red-tailed Shrike *Lanius phoenicuroides* shone like a beacon, distinctly different from the Red-backed Shrike; of course, you would also have to differentiate them from their resident Bay-backed and Long-tailed cousins. It was no surprise that the primary findings of the Passage Migrant Count (PMC) 2022, the first attempt ever in India to count passage migrant birds, revealed that among the transiting birds, the population of European Rollers *Coracias garrulus* is the highest. With their pale head and maroon back, these birds were everywhere, completely supplanting the Indian Roller. The Blue-cheeked Bee-eater *Merops superciliosus*, the second highest species counted in PMC 2022, is easily distinguished from the smaller green ones but the Greater Whitethroat *Sylvia communis* has to be carefully sorted out from the Lesser Whitethroat *Sylvia curruca*. It helped that the only flycatcher in this habitat at that time of the year was the Spotted Flycatcher *Muscicapa striata* – the third most-observed species during PMC 2022.

After sunset, we checked out the nightlife with the fond hope of paying obeisance to the last remaining passage deity on our list: the Eurasian Nightjar. Instead, we got a lovely Sykes’ Nightjar, a winter migrant to Northwest India that had arrived unusually early, and the common Savannah Nightjar. Just as we disappointedly put away our torches and cameras for the long drive home, a movement on the telephone wire adjacent to the road revealed the distinctive Eurasian Nightjar with its white wing markings! A second sighting of the same

*With their pale head and maroon back, European Rollers were everywhere, completely supplanting the Indian Roller.*



SAURABH SAWANT

bird down the road was even more relaxed as it allowed us detailed photographs. A sighting of the Indian Nightjar rounded off the nightjar clan; Vikramsinh said it was the first time in 11 years of birding in this habitat that he had seen four nightjar species in one night!

The residents and early winter migrants were pleasing fillers between the main deities. Can there be a prettier sight than a cavorting Painted Sandgrouse couple, oblivious to the cars nearby? The answer would be a resounding yes if you’re looking at four endangered White-naped Tits in a single frame, or a pair of White-bellied Minivets, with the male’s orange breast glistening in the sunlight. Striolated and Grey-necked Buntings, not easy to find elsewhere, kept us engaged constantly. The streaked tail of the White-tailed Iora (formerly Marshall’s Iora) distinguished it from its common cousin. Warblers are generally not easy to distinguish from each other, but not the lovely Orphean Warbler with its black head contrasting with its pale throat. A Eurasian Wryneck managed a nearly 180-degree turn towards us once we spotted it through its near-perfect camouflage.

**ABOVE** Blue-cheeked Bee-eaters may not always show the blue on their cheek but their turquoise-and-white supercilium can help identify them from the closely matched Blue-tailed Bee-eaters.

**FACING PAGE TOP** The author noted that the Spotted Flycatcher was the third most observed species during the Passage Migrant Count of 2022.

**FACING PAGE BOTTOM** The Banni grassland was formed from the sediments that were deposited by the Indus and other rivers over thousands of years.

All is, however, not hunky dory in this part of the world, as most of Kutchh is outside the formal Protected Area network. ‘Development’ in the form of agriculture, irrigation and other anthropogenic disturbances to the habitat results in shrinking natural spaces for these wonderful avian species to take a pit stop on their migratory journey.

We felt truly blessed and thankful after our *darshan*. So, if you’re bored in the summer or monsoon months and bemoaning the absence of the usual winter migrants to your shores, you know where to go for a truly heavenly experience! 

# TRAL

## A NEW GEM IN J&K



By Intesar Suhail and Dr. Asad R. Rahmani

The view of lofty mountains, clothed in trees and tall grasses, was breathtaking. On July 30, 2022, we had reached the boundary of this little-known sanctuary after an arduous climb through the quaint little village of Laam (also called Jawahir Pora). However, the narrow, pebbled-road between traditional wooden houses, punctuated by a few modern cemented structures, a gushing stream through the village, the singing of the Blue Whistling Thrush *Myophonus caeruleus*, and an unidentified warbler made the three kilometre climb thoroughly enjoyable. This visit to the newly-created Tral Wildlife Sanctuary, in India's northern-most union territory, was a birthday gift from the first author to the second.



DR. ASAD RAHMANI

**FACING PAGE** The Tral Wildlife Sanctuary (WLS) is a recently notified Protected Area (PA) of 155 sq. km. The topography is mainly hilly with forest-covered mountains, streams and rivers. Named after the historic town of Tral, it forms an important corridor for connecting Dachigam with Overa-Aru WLS, thus linking the hangul *Cervus hanglu hanglu* populations in these two PAs.

**ABOVE** Locals traditionally depend on the Tral forests for fodder, livestock grazing, and firewood for severe winter months.

comprising Shikargah and Khangund Conservation Reserves (CRs) as well as portions of demarcated forest area between these two CRs, as Tral Wildlife sanctuary. Named after the historic town Tral, the sanctuary is about 45 km. from Srinagar and is a part of Pulwama and Anantnag districts, which are famous for their apple and walnut orchards and flower-carpeted meadows. This new sanctuary is easily accessible as it is 50 km. from Srinagar airport and 15 km. from Awantipora, the nearest railhead.

Tral WLS and the nearby areas fall in the distribution range of the state animal – the hangul or the Kashmir red deer, *Cervus hanglu hanglu*. Once widely distributed in Kashmir and even some parts of Himachal Pradesh, this critically endangered taxon is now confined to Dachigam National Park, Tral and a few other adjacent areas. Tral is a sort of corridor for hangul as it connects Dachigam with the Overa-Aru Wildlife Sanctuary, and is therefore enormously important for linkage of the hangul populations found in these two PAs.

The entire Kashmir valley is beautiful and is popularly referred to as Jannat-e-Benazir, meaning ‘paradise without a parallel’; some areas have a special charm on account of their unspoilt landscape. Tral is one of them. The whole sanctuary is hilly, with forest-covered mountains, gurgling streams, and

*The entire Kashmir valley is beautiful, but some areas have a special charm on account of their unspoilt landscape. Tral is one of them.*

Jammu and Kashmir (J&K) has some of the finest forests and wetlands of the Western Himalaya. A new gem has been added to its 18 Protected Areas (PAs) – the Tral Wildlife Sanctuary. The Union Territory (UT) has four national parks, 14 wildlife sanctuaries and 30 conservation and wetland reserves. In 2004, the Bombay Natural History Society (BNHS) and BirdLife International had identified 21 Important Bird Areas (IBAs). In 2016, nine potential IBAs were added to the list, Shikargah-Tral being one of them.

**A CRITICAL CORRIDOR** Considering the importance it places on the value of biodiversity, the Jammu and Kashmir government in 2019 notified 155 sq. km. of forest,



ABOVE The author Dr. Asad Rahmani interacting with locals, who point to musk deer habitat in the distance. Such knowledge of local biodiversity can be channeled into potential sustainable livelihoods as nature guides.

meandering rivers. Tral forms an undulating terrain of the Outer Himalaya. Summer is pleasant, with temperatures from 25°C to 35°C but winters are cold, with snow in some parts lasting up to April. The peaks are cloaked with snow throughout the year.

**UNIQUE BIODIVERSITY** As the sanctuary ranges from 1,600 m. to more than 3,500 m., the flora changes from riverine to coniferous forests, which give way to alpine scrub and then to treeless pastures. From 2,300 m. to 3,000 m., the ecosystem is dominated by coniferous forests, represented by *Pinus wallichiana* and *Abies pindrow* as major species in association with *Picea smithiana*. If we go higher, we are greeted by alpine scrub, with *Betula utilis* as the most dominant species associated with *Juniperus recurva*, Rhododendron, Viburnum, Lonicera, and Primula in shady places. Above the treeline, the pastures are dominated by dwarf evergreen shrubs including *Juniperus recurva* and *Rhododendron anthopogon* associated with herbs, *Stachys sericea*, *Sieversia elata* and *Veronica melissifolia*. The riverine areas have *Aesculus indica*, *Fraxinus hookeri*, *Parrotiopsis jacquemontiana*, and *Juglans regia* with *Indigofera heterantha*, Lonicera, Jasminum, Viburnum, *Skimmia laureola* and many herbs and grasses.

More than 15 species of mammals, including some rare ones, are found within the limits of Tral Wildlife Sanctuary. Of course, the most famous is the hangul, but equally important species

*Parts of the Tral Wildlife Sanctuary have the distinction of being one of the oldest notified wildlife areas of the country.*

are the Kashmir musk deer *Moschus cupreus*, Kashmir grey langur *Semnopithecus ajax*, and the wolf *Canis lupus* (found in the alpine zone). Two species of bear – black bear *Ursus thibetanus* and brown bear *Ursus arctos* share the habitat, but each have their own ecological zones. Leopards *Panthera pardus* are fairly common and along with bears, are the main cause of conflict with shepherds, farmers and local people. The benign species (for human beings) are the jungle cat *Felis chaus*, red fox *Vulpes vulpes*, yellow-throated marten *Martes flavigula*, and Siberian weasel *Mustela sibirica*. These carnivores occasionally kill domestic animals, but are no threat to human beings.

Besides the well-known species mentioned above, Tral harbours several medicinal plants and rare species such as the witch hazel *Parrotiopsis jacquemontiana*, a small tree/shrub belonging to the witch hazel family. It is uncommon now on account of overharvesting, but survives in Dachigam and Tral. Locally named *pohu* or *hatab*, it is used to make the *kangri*. A *kangri* or *kanger* is an earthen pot with hot embers, held in a wicker basket. It is used by Kashmiris in severe winter beneath their traditional clothing *phera* (cloak) to keep them warm. The wildlife staff who accompanied us minutely described how a *kangri* is crafted by expert designers. The *kangri* is not only a utilitarian device but a work of art.

The erstwhile Conservation Reserves of Shikargah and Khangund, now a part of the sanctuary, have the distinction of being one of the oldest notified wildlife areas of the country, with their notifications dating back to 1945. They were designated as the hunting reserves of the Maharaja of the erstwhile princely state of Jammu & Kashmir.

**PROBLEMS AND SOLUTIONS** There is no PA in India that does not have problems – some are common everywhere, such as overgrazing by domestic livestock and encroachment on the borders. Forest fires are becoming increasingly frequent, thanks to climate change. On top of this, there is a shortage of staff. Eating of crop or livestock by wild



COURTESY J&amp;K WILDLIFE PROTECTION DEPARTMENT

03 / 14 / 2020 06 : 34 AM -08°C



COURTESY J&amp;K WILDLIFE PROTECTION DEPARTMENT

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The Tral Wildlife Sanctuary falls in the Endemic Bird Area 128: Western Himalaya of BirdLife International classification. Out of 11 restricted-range species of this Endemic Bird Area, Tral is home to the Tytler's Leaf-warbler *Phylloscopus tytleri*, Kashmir Flycatcher *Ficedula subrubra*, Kashmir Nuthatch *Sitta cashmirensis*, and Orange Bullfinch *Pyrrhula aurantiaca*. One of the criteria of identification of a site as an IBA is Biome species. Tral falls in Biome 7: Sino-Himalayan Temperate Forest, and the following species of this biome are found here: Himalayan Monal *Lophophorus impejanus*, Himalayan Rubythroat *Luscinia pectoralis*, Streaked Laughingthrush *Garrulax lineatus*, Variegated Laughingthrush *Trochalopteron variegatum*, Rufous-naped Tit *Parus rufonuchalis*, Green-backed Tit *Parus monticolus*, Bar-tailed Tree-Creeper *Certhia himalayana*, Yellow-breasted Greenfinch *Carduelis spinoides*, Fire-fronted Serin *Serinus pusillus*, and Yellow-billed Blue Magpie *Urocissa flavirostris*.

animals results in resentment against the staff and wildlife. The staff, already depleted in numbers, have to constantly attend to the incidents of human-wildlife conflict in villages, leaving them little time for patrolling the difficult terrain of the sprawling sanctuary. Many locals traditionally depend on the sanctuary for fodder, grazing of livestock, and stocking of fallen wood for severe winter months. As long as forest resources are used in a traditional and sustainable manner, it is not a problem.

The first author, who has been managing the sanctuary for three years, has suggested several management interventions in the freshly drafted Management Plan, such as strict protection of vulnerable areas, control of forest fires, soil conservation measures in some overgrazed and erosion-prone areas, increase in the number of staff and their training, arms registration in surrounding villages, constitution of village eco-development committees, quick compensation of damage by wildlife, vaccination of livestock, alternative livelihood opportunities for locals, awareness and publicity, basic facilities for tourists, development of walking/trekking trails, and training of local youth as nature guides. This newest sanctuary lacks good research



DR ASAD RAHMANI

**ABOVE** The Tral WLS is home to more than 15 species of mammals including the leopard *Panthera pardus* and black bear *Ursus thibetanus*.

**TOP RIGHT and TOP LEFT** A camera trap captures a hangul herd during different seasons at the same waterhole.

on the flora and fauna found within its boundaries. Even a proper checklist of birds is not available. Preliminary surveys show that more than 150 bird species are found here, which include endemic and most sought-after species (from a birder's point of view), such as the Kashmir Flycatcher *Ficedula subrubra*, the Kashmir Nuthatch *Sitta cashmirensis*, the Kashmir Nutcracker *Nucifraga multipunctata* and the Orange Bullfinch *Pyrrhula aurantiaca*.

At present, tourist facilities are rather limited (which could be a blessing in disguise). We suggest that at least some basic facilities could be developed so that intrepid birdwatchers can visit this conservation gem of Jammu and Kashmir. Proper training of local youth as tourist guides and development of nature trails will put off the pressure on more popular PAs such as Dachigam National Park.

Kashmir is undoubtedly one of the world's finest montane landscapes, a true paradise on Earth. Tourism that prioritises nature and the communities that are sustained by magical destinations like Tral define that holy grail... responsible tourism. 

# The Elephant in the Room

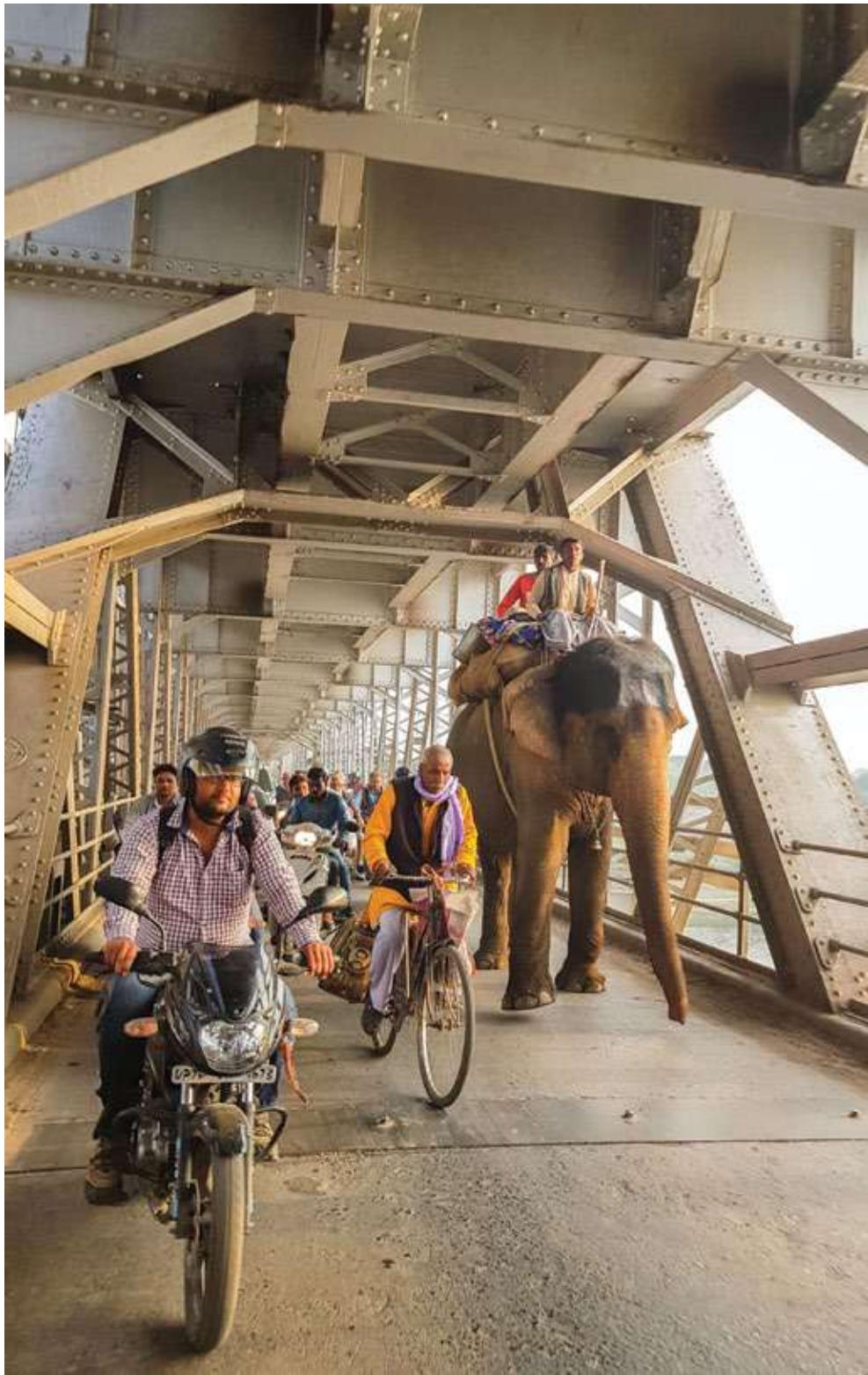
The sight of wild elephants quite naturally results in soul-satisfying elation and a sense of wonder. Sadly, none of the images on these pages will soothe our souls.

God of auspicious beginnings, gardener of forests, wielder of great memories, these gentle giants have always been revered in India, and they have played an important part in our cultural and religious heritage. In more recent times, technology has given us the ability to so damage elephant habitats such that not just the pachyderms, but even human existence has been threatened by our poor planet management. This has predictably resulted in conflicts that are more complex than most people imagine, because elephants are intelligent, social animals, that in some ways mirror the behaviour of human societies. Through the ages, unless elephant migrations were interrupted, the pachyderms have not been recorded destroying their own habitats. Reducing the stressors between elephants and humans requires nuanced, sensitive interventions, and this involves long-term solutions, not quick fixes. On the following pages, we merely scratch the surface of the problems we humans have caused across India, for the largest land mammals on Earth. From forest fringes to the edges of urban areas, the problem only seems to be getting worse. And yet, solutions exist... most of them involving that old line of wisdom: prevention is better than cure.



## A CRUEL RIDE

According to a Right to Information (RTI) query dating back to 2019, India has 2,675 captive elephants. Most were captured from the wild as calves and domesticated for use in temples, for religious processions, zoos, for entertainment and tourism. As can be seen from this image, elephants are often transported over long distances in cramped lorries, causing much stress, dehydration, injury and trauma. Under Section 40 of the WLPA, the ownership, transfer and transportation of elephants across states require written permission of the Chief Wildlife Warden and under Section 48(b), no Schedule I and II species may be captured and traded without certification from the appropriate department. But loopholes are all too often found, sometimes intentionally created. We have rules that allow elephants to be inherited or gifted. This neatly allows a thriving trade to bypass laws that sound quite reasonable to the untrained eye.



ALLJAH MOHAMMED

### NOT FOR THE ROAD

In the wild, elephants are socially complex animals, forming a herd of six to seven females, led by an experienced matriarch. The herd exhibits extraordinary teamwork – cooperating for defence, locating food and water, caring for offspring, and even collective decision-making. Captive elephants are amputated from this sense of belonging. If they undergo long periods of isolation at a young age, they exhibit signs of psychological distress and high levels of physical stress. Forcing elephants to walk on tar and concrete for long distances, often in harsh weather conditions, leaves them with torn footpads, cracked toenails and wounded cuticles. And they feel pain just the way we do.

**IN OUR FILTH**

On account of their sheer size, elephants spend roughly two thirds of their day feeding. They consume about 70,000 calories a day feeding on grasses, seeds, fruit, leaves and tree bark. The sight of this elephant consuming carelessly disposed plastic should cause us to hang our heads in shame. The image was taken close to Siliguri in West Bengal, but can be seen virtually across India. Sanctuary, through its campaign #InOurFilth, has been highlighting the issue of open rubbish dumps that end up causing illness and death to thousands of wild and even domestic animals. Eventually, the toxic plastics 'come home to roost' because microplastics have now been found in human mothers' milk. The sooner we wisen up and clean up our act, the safer life will be for us humans and the lifeforms with whom we share our planet.

ARJIT MAHATA

**HELL IS HERE**

This mother and calf duo, separated from the safety of their herd, face the ire of a village mob, armed with flame-soaked balls of tar and firecrackers. Biplab Hazra was awarded the *Sanctuary Photographer of the Year 2017* for this image, which was shot in the Bankura District of West Bengal. The image resulted in people responding with horror from across India and the world. Rubbish dumps, raids on cultivated lands and orchards are a direct outcome of humans nibbling away at elephant habitats. The onus of maintaining peace between us and the rest of life on Earth lies with humans.

BIPLAB HAZRA





### CRUSHED UNDER

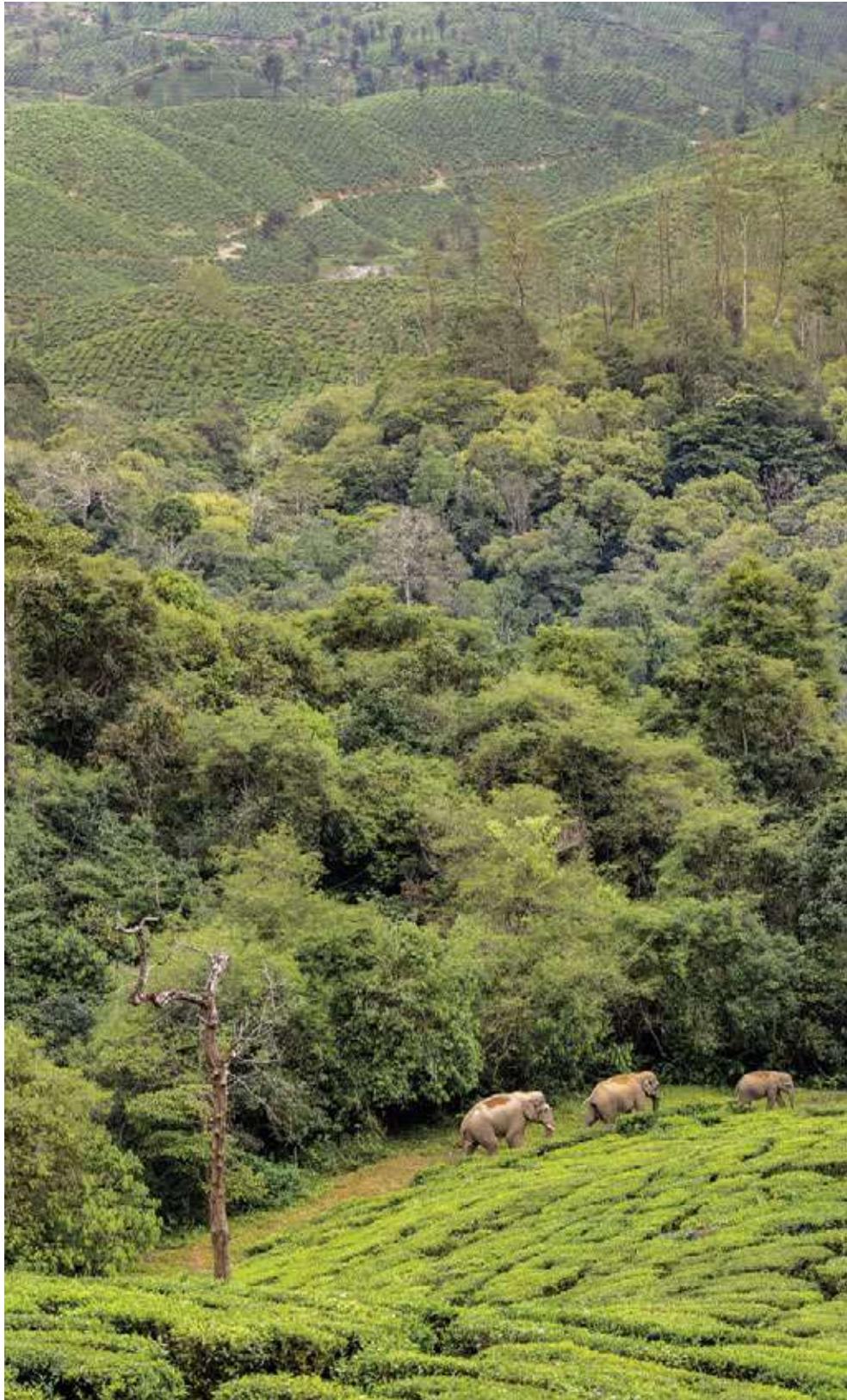
Elephants are known to have great memories, remembering migration routes and old waterholes for generations. But the rapid pace at which humans are creating linear infrastructures and wiping out forests puts these innocent animals at great risk. The tragic image we see here represents the fate of a herd of five elephants that were trying to cross a train track near Chapramari in West Bengal. It is said that over 150 wild elephants have been killed by trains across India in the past decade. Conservationists believe that this number is a hopeless underestimation.



### FOOD FOR THOUGHT

A wild elephant is chased away as it enters a paddy field in Rajabhatkhawa, West Bengal. Together with habitat fragmentation and forest degradation, elephants face an existential crisis caused by the scarcity of food. This is what forces them to search for high nutrition crops... most often with tragic results for both man and beast. While mitigation measures must be undertaken on a war footing, these must also be coupled with awareness drives to sensitise people not used to living in close proximity to wild elephants. Elephants require large tracts of undisturbed, unfragmented wildernesses. Ironically, such wildernesses are also recognised as critical to human survival because of their ability to temper the worst impacts of climate change by pulling atmospheric carbon back down to the ground.

SANJEEET MANGAT



#### NAVIGATING A CHANGED LANDSCAPE

A male elephant in musth chases a female and her calf across tea estates and interspersed evergreen *shola* patches in Valparai, Tamil Nadu. By destroying natural habitats, we are not merely sealing the fate of wild animals, but are also unleashing upon humans the kind of climate Armageddon that we have never experienced before. The bottom line is that if we leave space for elephants to live, nature will return the favour by making life safer and happier for humans desperately seeking escape from pandemics, climate vagaries and soil degradation.



#### NOT A JAYWALKER

BIJU BORO

A wild elephant from Amchang Reserve Forest, West Bengal, seems to have better road manners than most humans, as he is seen using a 'zebra' crossing. This pachyderm was among the lucky ones... most vehicles owners in a hurry, think nothing of speeding past wildlife. India's decision to expand its road networks at the cost of our Protected Area network bodes ill for both wild species and for humans whose very existence is dependent on the ecological services rendered by ecosystems and the denizens living therein.



#### BUT SOME HUMANS DO CARE

BIPLOB HAZRA

We have seen how roads, railway tracks, fences, and water reservoirs have made life hell for species such as elephants that have no way of adapting to the capricious ways of humans that they must surely consider as 'neighbours from hell'. But this young, possibly inexperienced, elephant that ventured too close to an artificial reservoir in Bankura, West Bengal was fortunately rescued. Elephants are good swimmers but not when high walls trap them. The West Bengal Forest Department works against impossible odds and it is only thanks to them, and locals who joined hands to rescue the pachyderm, that this story had a happy ending.

{ With more and more young people sensitised towards nature and made aware of our dependence on the natural world, we believe that future generations will prove to be more sensitive, and intelligent, than ours has proven to be. *Sanctuary* believes that, working with nature, future generations will allow these gentle giants to roam vast wildernesses, which will end up improving the lives of humans as well. }

# HOW A WATER HEATER CAN CHANGE AND SAVE LIVES



RIZWAN MITHAWALA/WCCT



By Rizwan Mithawala

**B**ony and dishevelled, Kanta Kamde stands barefoot outside her house. I stand with her in silence, arms wrapped around my chest, gaze lowered. It feels like a condolence visit. Then she speaks, “We had run out of firewood. The cooking gas cylinder too was exhausted; we had not refilled it in a long time.”

It was a cloudy afternoon in June 2022. Kanta, her husband Rajendra, and the younger of their two sons walked to the forest nearby to collect firewood. Rajendra decided to take a break and sat down to chew tobacco. “The tiger came out of nowhere,” she says. In a wink, her husband was flat on his stomach, and a tiger was crouching on his back. She ran to save him, and so did her son, carrying an axe. “When the tiger left him, he had just a few breaths left,” she says.

Just two days later, her neighbour Manda Kamde lost her husband. He had gone to sow seeds, not on a farm, but on land that encroached into the forest. She uses a single word, loaded with meaning, to describe this kind of farming – ‘jabran’. It has two meanings, and both are relevant for marginalised families like hers – ‘by force’, and ‘under compulsion, when left with no choice’. “Why should we not feed ourselves off the forest? To steal from the forest is better than stealing from someone’s house,” she explains without being asked.

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FACING PAGE A truck full of water heaters is unloaded for distribution at a village in Bramhapuri, in Maharashtra's Chandrapur district.



**ABOVE** Women have to walk several kilometres to bring firewood from the forest. Apart from the physical hard work, there is always a possibility of encountering a wild animal.

Kanta and Manda live in the forest-bordering village of Halda, in the Bramhapuri Forest Division of Maharashtra's Chandrapur district. Bramhapuri harbours a healthy population of tigers and supports 608 villages. To a large extent, people here depend on the forest for their sustenance; one of the primary needs that compel them to visit the forest is firewood. "Sarv kabi kaadyawar (Everything depends on firewood)," says Kanta. "Saglyा goshti jungle madbech... tarbh aambala pot bbarayla jamtay (We depend on the forest for everything... that's how we feed ourselves)," says Manda.

#### A NOVEL COMMUNITY-ORIENTED PROJECT

Many families and village leaders from Bramhapuri's villages feel that lives here are slowly changing, thanks to an energy-

efficient, biomass-fuelled water heater, known as *bumbb* in Marathi, which is promoted and distributed by the Wildlife Conservation Trust (WCT) at a 75 per cent subsidy. Jaindra Khobragade is an ASHA (Accredited Social Health Activist) worker in Nanded village in Naghbhid taluka of Bramhapuri. She used to walk close to nine kilometres to get firewood from the forest; along with the physical hard work, there was always a possibility of encountering a wild animal. But that was two years ago, when she was still using the traditional *chulha* to heat water for bathing. "Now I have the *bumbb*. The hardship of going to the forest has reduced greatly," she says. "Now I need very little firewood, as I mainly use leaf litter and agricultural waste as fuel for the *bumbb*. But that's not all; the *chulha* would heat a single vessel of water in 20-25 minutes. That would suffice only for a single person for bathing. The *bumbb* is able to heat enough water for four people in the same duration."

*"When we did not have the bumbb, we would leave for the forest (to collect firewood) at 10 a.m. and return by 5 p.m. Now, to fuel the bumbb, we just collect some fallen sticks from around the field and combine them with agricultural waste. The risk of running into wild animals has ceased. Our lives are much safer now."*

— Sanghamitra Khobragade, a beneficiary of WCT's energy-efficient, biomass-fuelled water heater project

WCT has so far equipped 4,015 households in Bramhapuri with the heater, with the BNP Paribas India Foundation helping scale the project. Following the successful adoption of the heater by the families, the Maharashtra Forest Department has adopted the same model and is now expanding the supply of the water heater in several forest villages of Chandrapur. The Department has so far equipped 1,015 households.

Women who use the *chulha* have to sit by it to constantly move the firewood and blow on it for effective burning. The smoke causes irritation in the eyes and respiratory problems. "There is no need to attend to the *bumbb*. I am able to use that time for other work," says Khobragade, adding, "Imagine I have fired the *bumbb* in the morning, and I get an emergency call — a woman is about to deliver. I will rush to her house. When I return after three hours, the water in the *bumbb* will still be hot." Her thoughts are echoed by another ASHA worker, her neighbour Sanghamitra Khobragade. "When we did not have the *bumbb*, we would leave for the forest (to collect firewood) at 10 a.m. and return by 5 p.m. Now, to fuel the *bumbb*, we just collect some fallen sticks from around the field and combine them with agricultural waste. The risk of running into wild animals has ceased. Our lives are much safer now," she says.

#### SUSTAINABILITY AT SEVERAL LEVELS

Speaking to the beneficiaries of the water heater, three Marathi words fall into my ears repeatedly: *turati*, *govrya* and *pala-pachola*. In Bramhapuri, the *toor* (a type of lentil) crop is grown on the *bunds* that border the rice fields. The residue of the crop, in the form of its stems, is locally known as *turati*. These dry stems were not of much use before the heater reached these villages. Now, they are a valuable resource as they burn efficiently in the burner compartment of the heater. *Govrya* are good old dried cow dung cakes, always available around the corner in Indian villages. *Pala-pachola* is leaf litter and sundry agricultural waste. The communities have themselves figured out the best fuel mix for the heater: crop residue mixed with cow dung. With the clever use of these alternatives, many say that visiting the forest is now a thing of the past.

"The fuel innovations that the community has come up with speak

**TOP RIGHT** Women who use the chulha are exposed to huge amounts of smoke, which can cause respiratory problems and irritation in the eyes.

**BOTTOM RIGHT** The water heater distributed by WCT is reducing the need for women to visit the forest to collect firewood, and also their exposure to harmful smoke.

to the ‘sense of ownership’ that the people feel about the heater, which is the most critical aspect of any intervention, for it to lead to a sustainable change in behaviour,” says Aniket Bhatkande, Head of WCT’s Conservation Behaviour team that runs the project. In Kitali Bormala, the first village to receive the *bumbb*, I come across an old heater with a brand-new vent hood. Its young owner, Sandip Masram, proudly tells me that they have been using it for three years, and he recently got a new vent hood made. A beneficiary maintaining the water heater for continued use also demonstrates the community taking ownership of the intervention.

**GAINING SUPPORT** However, it took time for the villagers to accept and adopt the heater. Murlidhar Gaurkar is the *sarpanch* (village head) of the 800-household Nanded village, and has been an ardent supporter of the *bumbb*. “Initially, people did not believe that a simple heater, that too one, which doesn’t require electricity, could heat water for four people in 15 minutes. Even after attending live demonstrations, many thought there was no need to pay for a water heater, even if it was made available at a 75 per cent subsidy, while firewood was free. At that time, they did not factor in the day’s earnings that they forgo when they go for firewood collection, nor the risk to life from animal encounters,” he says, while supervising the unloading of a truck full of the heaters – the third round of distribution in his village, taking the count to 400. “The game changer for our people was the fact that it could be fuelled with *turati*. People realised it would relieve them of the burden of going to the forest altogether. After that, it was the adopters who influenced their neighbours and relatives. People looked at their neighbours who had stopped going to the forest and were using *turati* and other waste material to heat water, and soon followed in their footsteps.”



RIZWAN MITHWALA



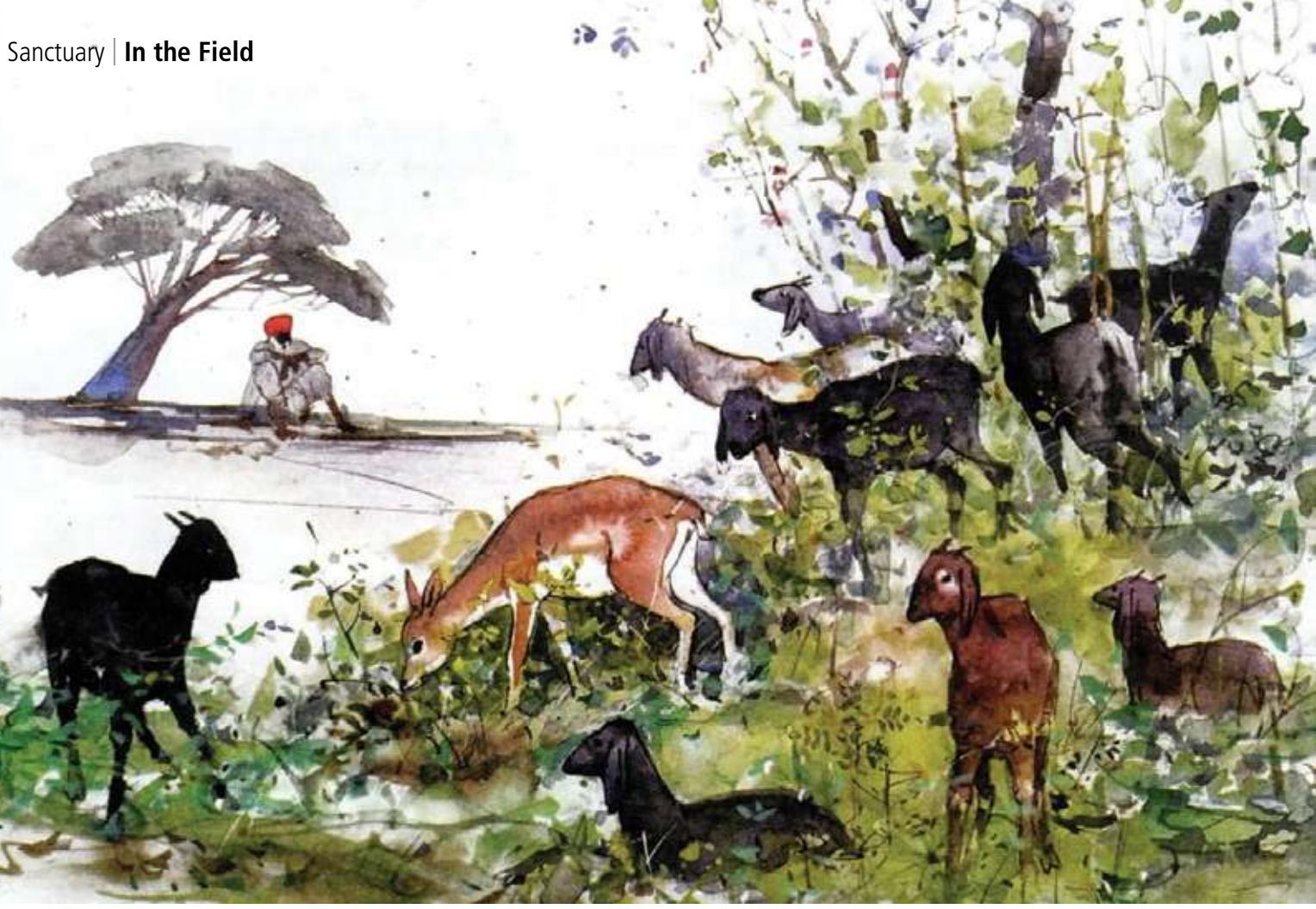
DR ANISH ANDHERIA

I ask Gaurkar if he sees the *bumbb* as an effective intervention for reducing human-wildlife conflict and deaths. “Now we have the LPG for cooking, *bumbb* for heating water, and *turati* and cow dung to fuel the *bumbb*. Why will people go to the forest? Lives have become easier with these facilities, and people have become lazy,” he says with a chuckle.

I ask WCT’s Development Scientist Tamanna Ahmad, who, along with the field team, is responsible for implementing the project, about how the project has evolved, and where she sees it heading. She says, “It

has been three years since the first *bumbb* was delivered. We have seen villagers move from hesitation to a point where they want us to prioritise their village over the neighbouring one for another round of distribution. This success has reinforced our faith in science-backed interventions, as we work towards finding solutions that directly address the causes of conflict and human deaths.”

**Rizwan Mithawala** is a Conservation Writer with the Wildlife Conservation Trust and a Fellow of the International League of Conservation Writers.



# THE CURIOUS CASE OF THE GOATBUCK

By Peeyush Sekhsaria

I was on a photography assignment for a book about Ellora Caves, a UNESCO World Heritage Site in Aurangabad, Maharashtra. We had a 10-day schedule, with one day off, the day of the week when the caves are closed to visitors. The book's author, Roger Vogler and I, decided to visit the caves of Pithalkhora, a site even more ancient than Ellora and just a couple of hours by road. It was a late winter morning and the roads, though not in good shape, were empty and we were making good progress. We were passing through an agricultural landscape with nothing special of note. Halfway to the caves we stopped for a break. The driver and I stepped out of the

car to stretch our legs while Roger remained inside. As I was absent-mindedly scanning the nearby fields, I saw a very unusual sight, which took me a second to process – a blackbuck fawn amongst a herd of goats walking casually at the edge of the field!

The blackbuck *Antilope cervicapra* is a beautiful antelope that has become increasingly rare. The landscape we were in was dominated by agriculture, but there were still patches that were open, dry and grassy, dotted with some trees and shrubs – the kind that could have had blackbuck.

But seeing a blackbuck fawn as part of a herd of goats wasn't normal. After informing the driver and Roger that I would need

ABOVE AND FACING PAGE The blackbuck *Antilope cervicapra* is a native species of antelope found in India and Nepal. Males sport a handsome dark brown to black coat, while females and juveniles are yellowish-fawn to tan in colouration.

10 minutes, I left the road to follow this unusual sighting. By blackbuck standards the fawn was still quite young, though in size it was on par with the goats. Delicate, with its beautiful sad eyes and long lithe limbs, it seemed to be a part of the herd and also lonely at the same time. I had not seen a blackbuck up close other than on a visit to Tal Chhapar Sanctuary in Rajasthan, where you can see them in large numbers, in the occasional zoo, and on television. But I had seen goats jumping around.

I couldn't help thinking that its behaviour was rather goat-like, the way it foraged for leaves amongst the shrubs and the way it moved. I was hoping to come across the herder soon. At a distance, I could see an old man with a wrinkled, weathered face accentuated by a silvery-white stubble, and a white cloth tied nonchalantly around his head. He was sitting on his haunches at the end of a little path in the shade of shrubs, watching



PEEYUSH SEKHSARIA

casually over his herd. I walked over to him, greeted him and struck up a conversation.

I explained why I was there, "I saw you have a *kalvit* (Marathi for blackbuck) fawn in your herd. That is very unusual, which is why I wanted to talk to you."

He shrugged. "Yes, there is this young fellow. What could I do? I found him, so small and abandoned... if I had not taken him, he would have died! Are you from the Forest Department?" he didn't seem too happy with my questioning. The

blackbuck is afforded the highest level of protection in India and any wildlife, even this little fawn the goatherder had found and saved, has to be reported and handed over to the Forest Department.

The region of Marathwada through which we were travelling, with its low rainfall, was good grassland country, that supported significant numbers of blackbuck, chinkara, wolves and in the past, even possibly cheetahs. Now largely cultivated, some populations of these beautiful antelopes are still to be

found (not, of course, in the hands of a local goatherd!) The famous *Bishnoi* of Rajasthan's Thar desert are known to be fierce protectors of wildlife and will go to any lengths to protect chinkara, blackbuck and other wildlife. You can easily find images and stories of *Bishnoi* women breastfeeding newborn fawns. All the same to see this fawn part of a herd of goats was unusual.

When the goatherd saw I was not an authority figure, he said to me, "See, some people told me I should report the animal to the Forest Department, but you know they would just take the helpless animal and might even have fined me, though I saved its life. Instead, I chose to care for him and fed him with goat's milk. Now he is like my child."

I was moved by the man's simple love. We sat there without saying anything. I kept watching the fawn and the herd. I noticed that the goats barely tolerated him. They did not let him get close to them and at times, when he seemed to have found a tasty leaf, they would drive him away. I felt bad for him.

Though I wanted to stick around longer, I was aware that I was well past my 10 minutes and knew that my colleagues would be wondering where I had wandered off to. Moved, I expressed my deep appreciation to the old man and walked away, taking a couple of last looks at the fawn. I couldn't but help wonder what this chap would grow up to be – a goatbuck? 

### The unique behaviour of blackbuck fawns

When I talked to Dr. Sumit Dookia, who specialises in desert antelopes, he said that what I had seen is unfortunately not so rare. Amongst communities that share a habitat with blackbuck, you will find fawns being brought up by people. They find the fawn completely abandoned and rescue it.

The blackbuck mother and young fawn have a very peculiar behaviour. Though blackbuck live in herds, a mother leaves to give birth in a sheltered area that she has identified. Shortly after birth, the fawn is licked clean by the mother to ensure that the smell of placenta is completely eliminated. Within a few hours, the young one is able to stand up and move around a bit on its spindly legs. It stays at the location it was born in, while the mother returns to the herd, coming back at intervals to feed it.

While the mother is away, the defence mechanism of the fawn is to lie on the ground, curled up as if dead, with its eyes slightly open. The fawn doesn't budge even if you come very close and will only move if prodded. With its colouration, behaviour and the fact that it has been licked clean of any smell, often a predator walks right by without even noticing it. Sometimes, people working in blackbuck habitats find a fawn and presume it is abandoned and defenceless and therefore bring it home. The goatherder's story seemed similar. Ideally, if one finds a fawn in the wild, it would be best to let it be and quickly move away without drawing attention to it.

# RAJAJI

## elephant and leopard in tigerland

ROUNAK PATRA



By Sipu Kumar, Rounak Patra, Navendu Page and Amit Kumar

The sudden cacophony of loud yapping calls from a nearby monkey biscuit tree *Holoptelea integrifolia*, heralded our first day in the Rajaji Tiger Reserve. Our attempt to track the source was interrupted by another familiar call... 'ki-ki-ki-ki-ki-ki-ki-ki-ki-kee'. A Changeable Hawk Eagle was perched beside us on a *bahera* tree *Terminalia bellirica*. In the sharp grip of its long talons was an unidentifiable bird that had already been decapitated. Within seconds, three Oriental Pied-Hornbills took off from the monkey biscuit tree and positioned themselves strategically on different branches of another tree, closer to the eagle. A few more raucous calls rang out, but they left the eagle unimpressed as it continued to focus on its prized catch. As it dropped a few chunks of meat to the ground, an opportunistic

hornbill swooped in, picked the meat with the tip of its large beak and gulped it down.

It was the Wildlife Institute of India's (WII) first field survey in Rajaji after the COVID-19 pandemic had shut down all Protected Areas (PAs) in the country to researchers and tourists. On a rainy August morning, with seasonal rivers filled to the brim and the park vegetation showcasing its emerald best, we were our own company. Alert, yet ambling slowly along the slippery road, a colleague spotted a yellowish tinge in the middle of the road. Focussing our binoculars on the spot about 400 m. away, we saw a pair of watchful eyes staring back, its rosetted tail twitching... a leopard! We held our ground with controlled excitement. After a careful inspection of its intruders, the feline silently vanished into the foliage.

Since 2020, WII, in collaboration with the Uttarakhand Forest Department, has been studying the impact of invasive species on native flora, and unravelling the plant-animal interactions that promote their proliferation. Some of WII's ongoing research has revolved around identifying major reserve areas where invasive species such as *Lantana camara*, *Ageratum conyzoides*, *Parthenium hysterophorus*, *Cassia tora*, to name a few, have crept in. Permanent plots were established systematically in different ranges of the tiger reserve for vegetation quantification. To understand the alteration of nutrient concentration, caused mainly by the notorious *Lantana*, soil samples were collected. Additionally, efforts were made to understand wild fauna interactions with native and invasive flora inside Rajaji. Line transects were laid in different forest ranges and walked repeatedly throughout the field work season to uncover if *Lantana* has altered the association between native plants and avian and mammalian frugivores. The Rajaji Forest Department has been diligently working to eradicate invasive species but their rapid proliferation makes it an extremely daunting task.

**A SPECIAL WILDERNESS** When not busy with field work, we took the opportunity to record the tiger reserve's biodiversity. The reserve is known for its large

elephant herds that actively use the forested corridors connecting Corbett and Rajaji (*Sanctuary* Vol. XXII No. 3, June 2002). The big bulls use the Chilla-Motichur corridors across the Ganga river, and many can be seen around the reserve in the summer. While the exact population of these gentle giants is difficult to ascertain as the elephants are large-ranging species that are always on the move, it makes estimating their population a challenging task. Roughly 800-1,000 elephants are believed to reside in and around Rajaji, Corbett and the Shivalik Elephant Reserve. Encounters with them were a part of our daily routine as field work progressed. From our vehicles being mock-charged by wandering bulls, or being chased off while walking line transects, to silently observing a herd of almost 30 elephants cool themselves at a waterhole on a scorching summer afternoon, our experiences with these giants were surreal. A part of the staple diet of the elephant is the bark of the kumkum tree *Mallotus philippensis*; its shattering inadvertently functioned as an alarm bell, alerting us during our line transect and vegetation sampling surveys. Working in the evening also had its perks. On one occasion, we were stopped cold by an Asiatic black bear, possibly in search of wild honey, which suddenly made its appearance. Apart from camera trap images, our photographic records of black bears were possibly the first in-person confirmation-sightings in western Rajaji.

In December 2020, a pair of tigers from the Corbett Tiger Reserve was released in the Motichur range of Rajaji. At present, they shuffle between different ranges of western Rajaji. Radio-collared and constantly monitored by forest officials, the two are the only known resident tigers. Given the low tiger density, this opened up opportunities for another extremely adaptable feline that has dominated this landscape – the Indian leopard. It is sometimes hard to comprehend how dramatically the leopard population has expanded inside the reserve. One reason is the absence of a more dominant co-predator until very recently and the other could be the reduced human disturbance after *Gujar* families were voluntarily relocated from the reserve to the Shivalik Elephant Reserve and other buffer zones. While traveling inside the reserve from one survey point to another, we sighted leopards 11 times in a single winter day. Handsome males, females with cubs, mating pairs, males competing for territory,



ROUNAK PATRA

**ABOVE** A leopard with a chital kill. The leopard population has expanded rapidly inside the Rajaji Tiger Reserve, possibly on account of the absence of a more dominant co-predator.

**FACING PAGE** A herd of Asian elephants cool off at a waterhole. The authors had several memorable encounters with the large pachyderms during their field visits in the Rajaji Tiger Reserve.

and bone-chilling hunts by these fierce predators – we saw it all!

In a world where these predators have been pushed to the edges of their habitat and forced to take refuge in human-dominated landscapes, where they are often killed by speeding vehicles on newly-constructed roads, or slaughtered by angry mobs, Rajaji offers the spotted cats safe sanctuary. The night turns hauntingly beautiful when leopards move about our base camp, often lurking around the solar fences or lapping water on the far side of large water sources where elephants come to quench their thirst.

**BIRD LIFE GALORE** Each day brought new surprises. We came across a striped hyena, photographed an albino sambar, fan-throated lizards and a king cobra. With an abundance of food to support a large prey base that thrives in these forests, herds of chital, sambar and nilgai were ubiquitous.

For plant lovers and botanists, Rajaji offers dense vegetation dominated by old-growth

forests of sal *Shorea robusta*. Most of Rajaji falls under the category of tropical moist deciduous forest, with trees such as *Ficus rumpfii*, *Bombax ceiba*, *Butea monosperma*, *Erythrina variegata*, *Terminalia spp.*, *Holoptelea integrifolia*, *Dalbergia sissoo*, *Cassia fistula* and *Mallotus philippensis*, all commonly seen throughout the reserve. The rare and endemic *Catamixis baccharoides* of Shivalik hills that grows only in rocky cliff areas, was also documented during one of our field surveys. Apart from the natural vegetation, a small nursery is maintained inside the park, which specialises in growing native grasses to provide food for herbivores and to replace vegetation lost during forest fires.

Over an entire survey season that spread across summer, winter and the beginning of the monsoons, we saw an abundance of birdlife in and around the reserve, from the drumming of the elusive Great Slaty Woodpecker – the largest woodpecker species in the world – to Great Hornbill flocks that thrive in the undisturbed, dense forested parts of Rajaji, and even an albino Jungle Babbler.

*In a world where leopards have been pushed to the edges of their habitat and forced to take refuge in human-dominated landscapes, where they are often killed by speeding vehicles, or slaughtered by angry mobs, Rajaji offers the spotted cats safe sanctuary.*



**TOP LEFT** A duel between two tigers in a river in the Terai Arc Landscape. The reserve is home to around 37 tigers.

**BOTTOM LEFT** The Oriental Pied Hornbill Anthracoceros albirostris is a habitat specialist that mostly consumes fruit, and occasionally small animals.

spent surveying the Rajaji Tiger Reserve was an eye-opener. While on one hand we faced difficulties staying in a camp that lacked even basic amenities, it helped us understand the challenges faced by the forest staff, who are mandated to protect parks by way of daily patrols, with the attendant risk of wildlife attacks. Down the years, Uttarakhand has witnessed rapid urbanisation, with a heavy influx of religious tourists, trekkers, bikers and weekenders visiting Rajaji in virtually every season. Easy access provided by its location, connected by roads that link suburban towns, and large cities such as Rishikesh, Dehradun and Haridwar has turned the Rajaji Tiger Reserve into a tourist haunt. In the process elephant corridors have been disrupted and road kills have increased manifold. Even then, development is a runaway train that waits for none. As researchers and conservationists, our job focuses on finding mitigation measures that suit both wildlife and the people residing in these areas. A prime example of this includes the construction of a major highway linking Delhi to Dehradun by the National Highway Authority of India through the Ganeshpur-Dehradun (NH-72A), that cuts through a vital wildlife corridor. The authorities say this will reduce the journey time from 6 to 2.5 hours from New Delhi. While the initial decision was to expand the existing highway that would have paved way for a larger destruction of forests and roadkills, an elevated corridor of 12 km. and a 340 m. tunnel was found to be an effective solution. Though the immediate impacts of construction cannot be evaded, the long-term consequences of an elevated road will actually help reduce habitat fragmentation and bolster connectivity, as animals will be able to pass without any disturbance through the underpass. Additionally, Uttarakhand's Shivalik Elephant Reserve, set up in 2002 under 'Project Elephant', was to be denotified in November 2020, but fortunately was blocked when the Uttarakhand High Court issued a stay order after a Public Interest Litigation (PIL) was filed pleading the court to stop the process.



Our field visits recorded almost 13 species of woodpeckers. Interestingly, the reserve harbours a significant population of two critically endangered vultures – Cinereous (a winter migrant) and Red-Headed (a resident) – and the endangered Steppe Eagle (another winter migrant). Apart from that, Changeable Hawk Eagles, Crested Serpent Eagles, White-eyed Buzzards and Peregrine Falcons are seen throughout the year. During

summer, the breeding songs of the Indian and Hooded Pitta were heard through the forests. As dusk settled, vivid calls and flights of Savanna Nightjars and Large-tailed Nightjars could be heard and seen throughout. Nights are for owl lovers; our sightings ranged from the Brown-hawk Owl to calls of Oriental and Collared Scops Owls and Brown Wood Owls.

### WHAT DOES THE FUTURE HOLD?

In hindsight, our time

*While the exact population of these gentle giants is difficult to ascertain – they are large-ranging species that are always on the move – an estimate suggests that a population of 800-1,000 elephants have made Rajaji, Corbett and the Shivalik Elephant Reserve their home.*

**TOP RIGHT** Surprise encounters with elephants, as experienced by these forest staff while constructing a waterhole, is common in Rajaji, known for its large elephant population.

**BOTTOM RIGHT** The rapid spread of the invasive plant Lantana camara has led to an increase in generalist species like the Indian White-eye *Zosterops palpebrosus*.

On the outside, Rajaji continues to face anthropogenic pressures, thanks to incessant developmental activities. As the government focuses on more commercial infrastructures, planners seem to have forgotten the most valuable infrastructure, which protects Haridwar, Dehradun, Saharanpur and Rishikesh, is Rajaji. These projects will enrich only the contractors, while whittling away at the ecological foundations of Rajaji.

Thus far, this little appreciated wilderness has withstood the assaults unleashed on it. But scientists warn that a tipping point is drawing near and that the price paid for unbridled economic development might well undermine the economies of lakhs of people, possibly even threaten the holiest of cities and townships that emerged because of the veneration that our ancients felt for the Himalaya and its outlying forests and rivers such as the Ganges and the Yamuna. Today this iconic forest has paved the way for

The Terai Arc Landscape – a vast area between the rivers Yamuna in the west and Bhagmati in the east – comprises the Shivalik hills, Bhabhar region and the Terai floodplains. This unique landscape harbours three major flagship species – the Bengal tiger, Asian elephant and the one-horned rhinoceros. In the Shivalik hills, Rajaji National Park and Jim Corbett National Park form a dominant part of the western Terai Arc Landscape, and are home to the tiger and elephant. The Rajaji National Park, named after the Indian statesman, lawyer, writer and freedom fighter C. Rajgopalachari, was established in 1983 – an amalgamation of three previously recognised reserves namely, Rajaji Wildlife Sanctuary, Motichur Wildlife Sanctuary and the Chilla range of the erstwhile Pauri Forest Division. In 2015, the National Tiger Conservation Authority declared the park as a tiger reserve to provide maximum protection to this 820.42 sq. km. forest.



SIPU KUMAR

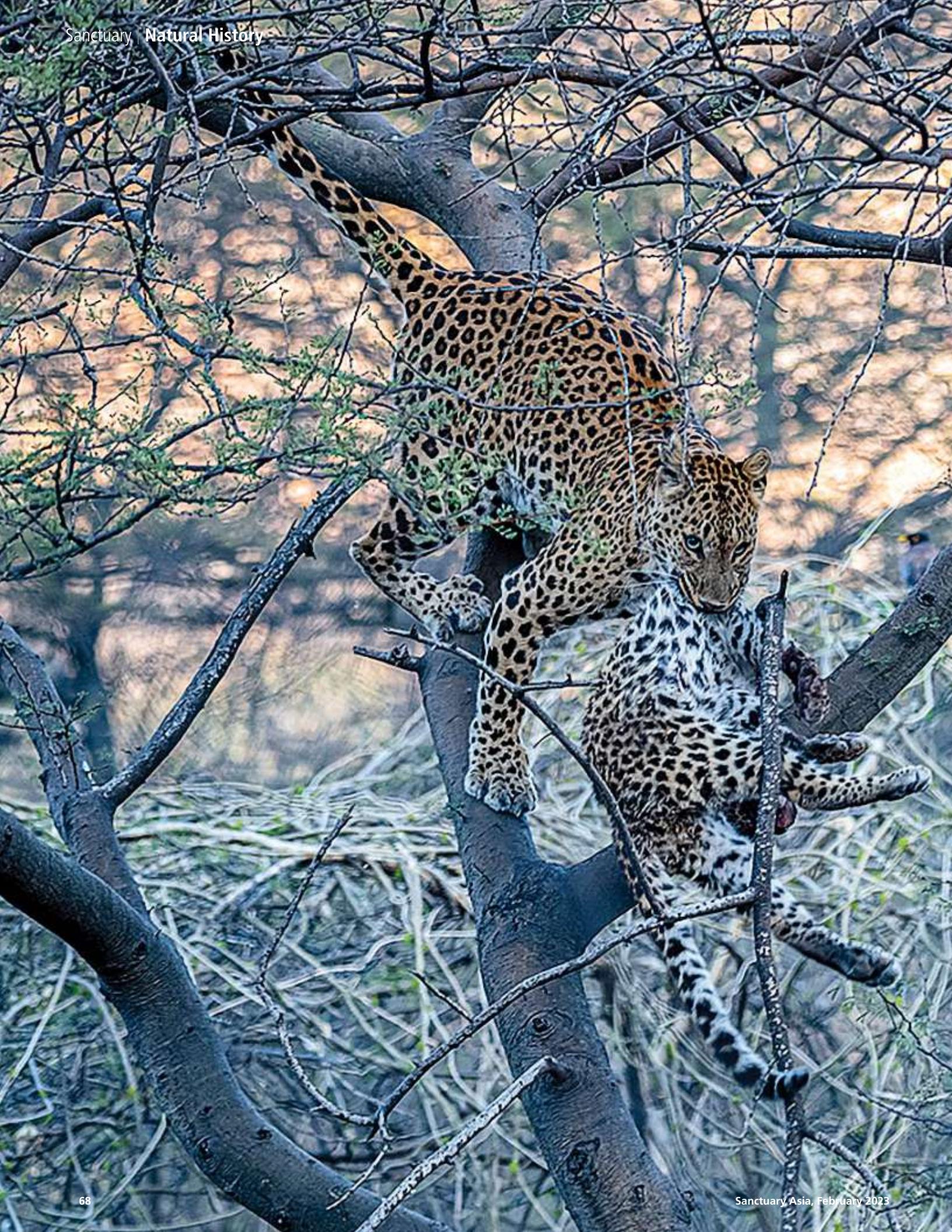


ROUNAK PATRA

several research projects on flagship species, and has served as a platform for scores of field-based researchers whose on ground training has turned them into sensitive forest officers and conservationists. We must all unite in defence of Rajaji, its wild denizens and the local communities that depend on it for their survival. ■

*The authors are thankful to the Uttarakhand Forest Department, especially the Field Director and forest staff of Rajaji Tiger Reserve, and grateful to Dr. Dhananjay Mohan for his insights, DST-SERB for funding the research project, and Vijendra Kumar for assisting in the field.*

**Sipu Kumar** is a Ph.D. Scholar at the Wildlife Institute of India (WII), mainly interested in understanding plant-animal interactions. **Rounak Patra** is an avid birdwatcher as well as photographer, whose research interests include the community ecology of birds and their response to climate change. **Navendu Page** is a scientist at WII, who is deeply interested in natural history, evolution and field botany. **Amit Kumar**, a scientist at WII, has been exploring the Himalayan region and Shiwaliks to understand vegetation patterns and plant associations.





# A Mournful Morning

While out on a morning safari in the Jhalana Leopard Reserve, Rajasthan – a 23 sq. km. area that is home to nearly 40 leopards – the photographer heard a sustained growl from a female leopard, and began following her, keeping a safe distance. Suddenly, the feline stopped in her tracks, and looked intently up a tree. In a few deft moves, she climbed up and perched on one of its branches, united with what appeared to be her sleeping cub. She nuzzled its head, cajoling it awake, only to realise that it was dead.

After several long moments, she lifted the cub by placing the scruff of its neck in her mouth and descended from the tree. As she ran towards her cave in the upper hills, a pack of hyenas – that had earlier been spotted at a distance – began following her. After a while, the scavengers gave up the chase, perhaps because the leopard finally made it to the safety of her cave.

Later, the photographer learned from the Forest Department that their camera traps had recorded another female leopard killing the cub and placing it on top of the tree. The harrowing growls of the mother leopard juxtaposed with the opportunistic attempts of the hyena pack on that mournful morning when the mother found her cub dead on a tree, created a uniquely haunting spectre that will stay with the photographer for a long time to come... 

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**PHOTOGRAPHER:** Subhasish Bhandari

**LOCATION:** Jhalana, Rajasthan

**DETAILS:** Camera: Nikon D810, Lens: Tamron 150-600 mm., Aperture: f/5.6, Shutter speed: 1/250 sec., ISO: 560, Focal length: 250 mm.

**DATE:** March 16, 2019, 7:49 a.m.



# WILL DIBANG VALLEY BE SAVED?



By Francesca Cotta

The recently-released minutes of the Forest Advisory Committee (FAC) meeting, held on December 27, 2022, reveal that the statutory body has rejected the proposal for the Etalín Hydro Electric Project (EHEP) in its current form. This news has brought a glimmer of hope and is a welcome win for the thousands of

The Forest Advisory Committee has rejected the Etalín Hydro Electric Project in Arunachal Pradesh in its present form and has asked the state government to file a fresh proposal. *Sanctuary*'s Francesca Cotta gives us an overview of the history of the project and the tremendous ongoing community effort and campaigns to protect this biodiversity rich and seismically active zone in Northeast India.

petitioners – comprising youth from the *Idu* and *Adi* communities that live in Dibang valley, scientists, civil society organisations and the general public – who have been vociferously opposing the EHEP for a few years now.

*Sanctuary* has consistently been publishing the many representations sent to the FAC, as well as the findings of several

independent and peer-reviewed scientific studies on the ecological significance of Dibang valley; the impact that large dam infrastructure projects will have on the socio-cultural fabric of its resident communities; natural hazard risks and climate change-related threats; and the economic unviability of such projects. Several experts have critiqued the procedural flaws in obtaining

clearances for the EHEP. We have published responses to [frequently asked questions](#) and compiled all the coverage of the issue and the resistance movement that has sprung up as a response to it, in a comprehensive [tool kit](#) on our website.

During the meeting, it was noted that the FAC has reviewed the proposal in 2015, 2017, 2019, 2020 and 2022. It was also observed that a large number of representations had been received, voicing concerns against the project. The FAC pointed out that the State Government of Arunachal Pradesh (GoAP) has had a poor record of compliance with respect to the conditions stipulated by the FAC in the approval given for the earlier projects. They said that given that the facts and figures were presented by the State Government to the FAC back in 2014, it is now crucial that these are freshly reviewed – especially regarding the number of trees required to be felled for the project.

The FAC noted, “To resolve the issues raised in various representations, the state government may constitute a high-level empowered committee to look into the various concerns received and come with resolution therein. The Sub-Committee constituted by FAC earlier under the Chairmanship of Dr. Sanjay Deshmukh has looked into the representations received and submitted a report with recommendations. However, there are more representations, which were received by this Ministry after the visit of the Sub-Committee as well, and the same have been communicated to the state government. The representations are generally raising concerns against the instant proposal and need proper redress by the state government in totality.”

The minutes further note: “It was highlighted that in the earlier approved projects wherein Forest Clearance has been accorded there is poor record of compliance with respect to conditions stipulated by the FAC while according the forest clearance. Further, FAC took note of the submission made by the State Nodal Officer that there are a lot of representations objecting to the present proposal and with regard to already approved projects as well. Due to which already approved projects have not yet started and certain projects are not yet being completed. In view of the above, the FAC requested the state government to review the status of all approved projects



SAMSUL HUDA PATGIRI

(operationalisation/execution of the projects, commencing and completion of the project and thereafter compliance with regard the Stage-I and Stage-II conditions) and submit a status report to this Ministry at the earliest.”

Given the explicit mention of the robust representations that have poured in from members of civil society in the past several months influencing the FAC’s decision to scrap the project in its present form, we thought it useful to recap the most recent letters that have been submitted to the FAC, in the weeks leading up to their December meeting.

### **SANCTUARY'S FOUNDING EDITOR WRITES TO FAC**

On October 16, 2022, *Sanctuary's* Founding Editor Bittu Sahgal, previously a member of the Standing Committee of the erstwhile Indian Board for Wildlife as well as various Environmental Expert Committees, wrote a letter to the FAC about the worrying dilution of conditions on which forest clearance had been granted to infrastructure projects in Arunachal Pradesh.

His letter is a direct response to the news that the Arunachal Pradesh state government is unable to declare a national park in Dibang valley, despite this being a condition on the basis of which forest clearance was granted to the ecologically destructive Dibang Multipurpose Project in this biodiverse region. The Ministry of Environment, Forest and Climate Change gave in-

**ABOVE** The Idu Mishmi tribe's *long-standing cultural practices and beliefs* have allowed the tiger and its habitat to thrive in the community-owned forests of Dibang valley, the highest-known habitats of tigers in India.

**FACING PAGE** Reportedly, 2.7 lakh trees would need to be felled for the Etalin Hydro Electric Project (EHEP) in its current form. Such biodiversity loss cannot be compensated with afforestation.

principle approval to the project in 2014 without the state declaring a national park. Now, eight years after the project was conditionally approved, after previously being rejected twice by the FAC, the state government has expressed that it cannot declare the national park.

In his letter, he suggested that the proposal should be examined afresh instead of diluting the existing conditions and assuming the project as *fait accompli*. He expressed his grave concern over what he described as an ‘emerging trend for diversion of large swathes of forest land in Arunachal Pradesh for mega hydro power projects.’

He wrote, “The state government and project developers are often initially silent about the conditions imposed by these committees in lieu of the loss of forest and wildlife habitat at the time of recommendation. Once time has passed or the project is a *fait accompli*, the state government expresses its belated inability to implement the conditions, instead of doing



**ABOVE** The clouded leopard *Neofelis nebulosa*, is a shy cat inhabiting dense forests from the foothills of the Himalaya through mainland Southeast Asia into South China; pictured here in a camera trap image from Dibang.

so before clearances are granted. Faced with *fait accompli*, the concerned committees then dilute the conditions (instead of examining the project afresh for clearance).

He also highlighted that the Government of Arunachal communicated its inability to declare a national park eight years after the FAC gave its conditional recommendation. Further, this recommendation came after the proposal was rejected twice on grounds of the rich biodiversity, presence of endemic and endangered flora and fauna and the considerable downstream impacts, which were yet to be studied.

### Dibang: A Global Biodiversity Hotspot

Dibang valley is the largest district in the state of Arunachal Pradesh. The valley borders China to the north, and boasts remarkable topography and rich biodiversity. Snow-capped mountains, lush tropical and sub-tropical forests, wild grasslands, innumerable high-elevation lakes, raging rivers and sparkling mountain streams characterise this region. Dibang valley lies within the Eastern Himalaya Global Biodiversity Hotspot.

Recently, scientific assessments have found Dibang valley to host over 555 bird, 60 mammal, 381 butterfly, 42 fish, 42 reptile, and 48 amphibian species.

**I DU MISHMI YOUTH HIGHLIGHT RIGHTS VIOLATIONS TO FAC** Youth representatives from the indigenous *Idu Mishmi* community of Dibang valley have expressed their distress about the violation of their rights in regard to the controversial Dibang Multipurpose Project (DMP) on their ancestral lands. In a strongly worded letter to the FAC, the youth have asserted that no Gram Sabha consent has been sought “from Gram Sabhas whose forest lands and rights will be impacted by compensatory and ameliorative measures” as mandated by the *Forest Conservation Act*, 1980.

The letter also highlights their concerns about the 16 other mega-hydro projects proposed in the Dibang basin, including India’s largest dam, the Etalim Hydro Electric Project, and the impact of various other infrastructure projects

on their homeland. They pose difficult questions to the FAC, stating “... our land has been taken away from us for DMP, highways, numerous PMJYS road projects, all of which have violated mandatory environmental safeguards damaging way more land than we were compensated for. How much more of our ancestral land will be taken for development and protection, the benefits of which will not be available to our people?” In light of these facts, the collective has called for “the government of Arunachal Pradesh, the FAC and MoEFCC examine the forest diversion proposal for DMP afresh for its direct and indirect impact on our forest land and rights”.

**I DU MISHMI CULTURAL AND LITERARY SOCIETY EXPRESS CONCERN TO FAC** In a letter submitted to the FAC on November 28, 2022, the Idu Mishmi Cultural and Literary Society pointed out that since 2014, when the FAC gave clearance for the DMP on the condition that a national park was declared in the valley, at no point did the GoAP communicate and consult with the affected indigenous communities about this condition.

They also highlighted the dilution of environmental laws and double standards on the part of the FAC, in giving the GoAP

**TOP RIGHT, MIDDLE AND BOTTOM**  
*Master craftsmen, the Idu Mishmis are a major tribe inhabiting the Dibang valley. Youth representatives from the indigenous Idu Mishmi community of Dibang valley have expressed their distress about the violation of their rights in regard to the controversial Dibang Multipurpose Project (DMP) on their ancestral lands.*

clearance on strict condition that a national park be declared in the valley, but then later allowing the park to be switched to a Community Conservation Reserve under the *Wild Life (Protection) Act, 1972* (WLPA).

Of grave concern to the Society was the MoEFFC's effective rendering of the *Idu Mishmi*'s "historical, customary individual and community land rights futile by not allowing us to explore legal avenues beyond the WLPA." They pointed out that instead, the MoEFFC had "shifted from one Protected Area (PA) to another form of PA with no effective decentralised mechanism of land governance, or equal decision-making power or participation or benefit sharing modalities whatsoever. Instead, provisions of *Forest (Conservation) Amendment Rules, 2016* and WLPA have been pitted against FRA to complicate land rights."

Based on the above procedural issues laid out in the letter, they stressed on the need to place the entire forest diversion proposal for the dam projects, along with the conditions, before local communities, "to understand the full range of impact on our lands and rights."

**T**HE WAY FORWARD While we seem to have dodged the bullet temporarily, it is vital to continue the momentum to garner support against the Etalin Hydro Electric Project. Given the impact – the irreplaceable loss of biodiversity, potential cultural dilution, and the risks of such projects in this seismically active geological region, particularly in the face of climate change, the stakes are just too high for us to rest on this temporary respite until the project clearance is completely rejected. 

**Francesca Cotta** is a writer and editor who has worked on projects related to sustainability, travel, environmental justice, and literature. She is currently an Assistant Editor at *Sanctuary Asia*.



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# A Snowy Embrace in a Hot Spring

The snow monkeys of Japan (*Sanctuary* Vol. V No. 4 October/December 1985) are fascinating animals. Besides having one of the longest lifespans among monkeys, of close to 30 years, these Japanese macaques *Macaca fuscata* have the unique human-like habit of washing their hands before eating. Nagano, located to the west of Tokyo, is the best place to observe and document them. The photographer Arindam Bhattacharya made several trips there during his stay in Japan and this image was captured on a harsh winter morning in February.

There is a particular hot spring in Nagano where snow monkeys love to congregate, soaking themselves in the heated waters to overcome the chilly winter. The night before this image was taken, it had snowed heavily in the area, and Bhattacharya decided to visit the hot spring to capture the monkeys during snowfall. It was nearly an hour's trek along a mountain trail to get there.

The crowd of tourists in Nagano makes it tricky to get a good shot, so instead, he began to observe a pair of monkeys – a mother and baby. After a while, they grew more comfortable in his presence. It began snowing again and the baby monkey clung tightly to its mother. The duo got closer to him. He watched them for several long minutes, mesmerised by this tender moment. It was when the duo came even closer to him that he took this wide-angle shot. ☺

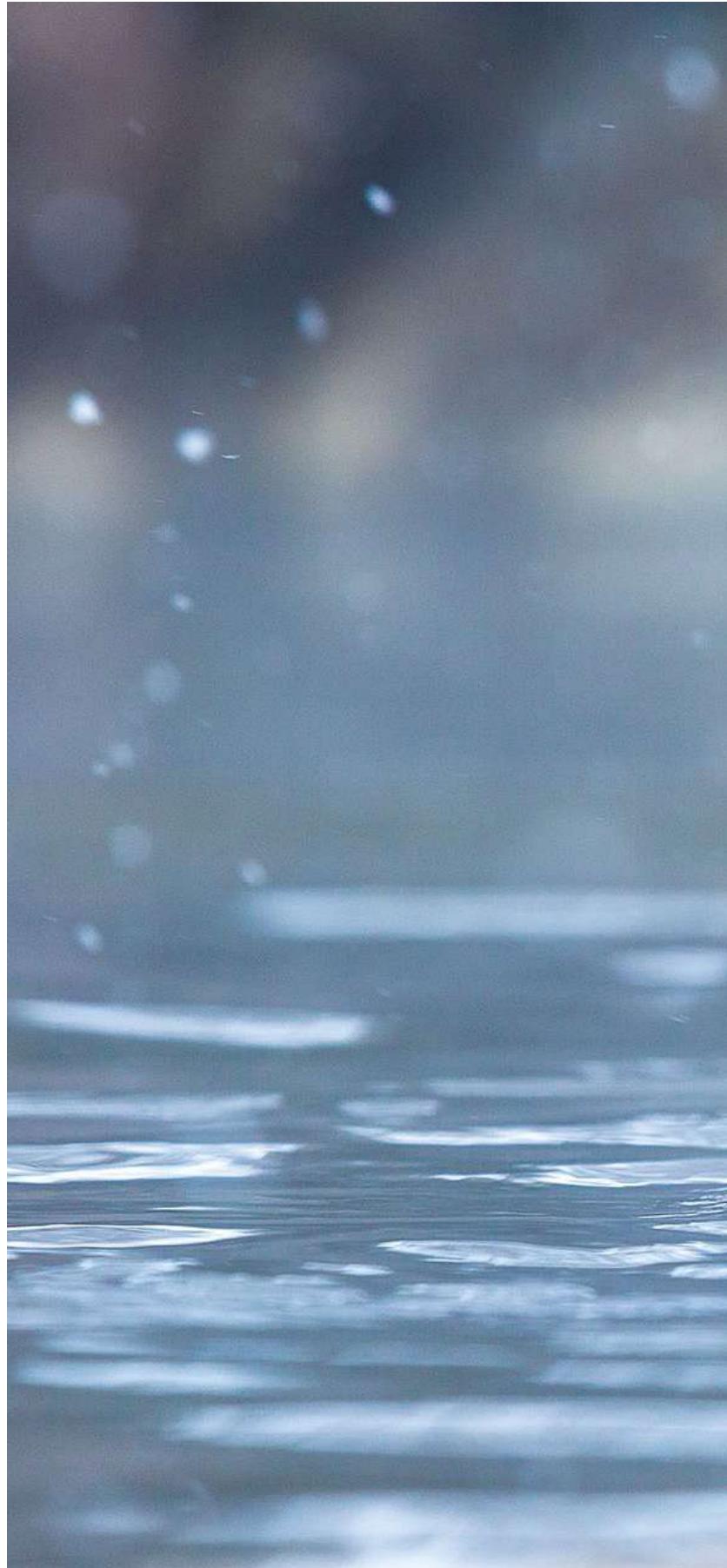
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**PHOTOGRAPHER:** Arindam Bhattacharya

**LOCATION:** Nagano, Japan

**DETAILS:** Camera: Canon 5D Mark3, Lens: Canon 100-400 IS1, Shutter speed: 1/400 sec, ISO: 640, Aperture: f/8, Focal length: 330 mm.

**DATE:** February 17, 2018, 4:33 p.m.





# Sanctuary's MUD ON BOOTS

Bimonthly Updates for November-December 2022

## TO NEW BEGINNINGS!

In October 2022, Amir Kumar Chhetri and Priyanka Das's (Amir's mentor and colleague) independent proposal titled 'Addressing the underlying driver of human-elephant negative interaction in northern West Bengal' was selected for the current batch of the [Coexistence Consortium](#) fellowship. Following this, they visited the University of Trans-Disciplinary Health Sciences and Technology (TDU) in Bengaluru for a month-long course. This was a wonderful opportunity for Amir and Priyanka to brush up on old knowledge and learn new concepts while socialising with others working in the conservation sector.

Incidentally, this trip revealed one of the most important markers of the true success of Amir's project in Panijhora forest village, West Bengal – the village committee, created under his leadership, routinely maintained and efficiently monitored the community-owned solar-powered fences in his absence. Between November and December, bull elephants

broke the solar-powered fences 11 times, and each time the committee members patiently repaired them. After returning home in December, Amir collected data from farmers on crop yields. He and his colleagues at the [Coexistence Project](#) are curating and studying the data to get insights into the impacts of solar-powered fence installation on crop harvests.

Additionally, Amir and Priyanka are using Rs. 25,000, a part of the Mud on Boots Project grant, to create a short video documenting Amir's work in Panijhora. This video will be used as resource material during future awareness talks to share his experiences and learnings gained while leading the construction, monitoring, and maintenance of the solar-powered fence in his village. The video, which will be created by [Green Hub](#), Tezpur, will be shot in March 2023.

## OF LANGURS AND SEEDS

In Chamba, Vishal Ahuja has slowly but steadily been stocking precious resources central to his long-term forest

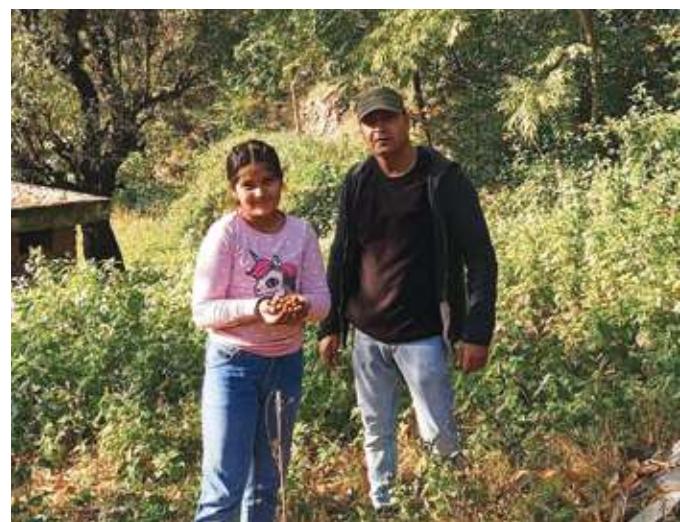
restoration project – seeds of all native fruiting trees that constitute the Chamba sacred langur's diet. In November and December 2022, he spent 16 days visiting nearby forests to collect seeds of four species of native trees, based on their times of maturity. During each four to five-hour long trip, he made sure to select well-matured and healthy-looking seeds and also ensured the genetic diversity of each species by collecting seeds from numerous distant locations. So far, he has collected 130 horse chestnut *Aesculus indica*, 150 soapnut *Sapindus mukorossi*, and approximately 200 *kainth* *Pyrus pashia* and *siris* *Celtis australis* seeds.

In the upcoming months, these seeds will be sown in Vishal's native tree nursery, which has been started at Dugli village. An area of 752 sq. m. has been leased for this purpose from Dharm Pal, a local farmer. The Mud on Boots project secured an additional grant of rupees five lakhs as seed money for starting this nursery of native fruiting trees to support Vishal's long-term forest restoration project.

COURTESY PRIYANKA DAS



Amir Kumar Chhetri and Priyanka Das during one of their field visits in the Dooars, West Bengal.



On one of his field trips, Vishal Ahuja was accompanied by his daughter, who is an avid nature-lover. They collected seeds from soap-nut trees.

COURTESY VISHAL AHUJA

Meanwhile, Vishal also made time to compile the data from the first-ever census of the endemic Chamba sacred langur, conducted between October 10 and 12, 2022. Vishal and his colleagues at the [Zoo Outreach Organisation](#) (Coimbatore) have prepared a report that will soon be shared with the Forest Department of Chamba (Wildlife Division). This report will inform the long-term conservation plans of this endemic primate residing in and around the Kalatop-Khajjiar Wildlife Sanctuary in Chamba, Himachal Pradesh.

### SLOW AND STEADY

In Pokhran, Rajasthan, Radheshyam Pemani Bishnoi's conservation efforts are showing small, incremental results as the reduced numbers of the free-ranging dog population has resulted in drastically low incidences of free-ranging dog attacks – three incidents in November and December 2022, as compared to an average of eight to 10 attacks per day before Radheshyam's collaborative efforts, on wildlife such as chinkara, nilgai and Great Indian Bustards (GIB). For the past four years, Radheshyam has been working with the Forest Department of Jaisalmer (Rajasthan) and has relocated around 300 free-ranging dogs to the Jodhpur dog centre.

On November 15, 2022, Radheshyam and Dr. Sumit Dookia (Honorary Scientific Advisor of ERDS Foundation and Faculty, Animal Ecology and Wildlife Biology, Guru Gobind Singh Indraprastha University), met with the DFO, Jaisalmer (Wildlife

Division), and discussed ways to address the region's main threat to GIBs – high tension electricity lines. They informed the DFO about the shabby condition of the bird diverters that have been put in place to ensure GIBs do not fatally collide with these fatal electricity lines and discussed the need for checking their quality before approving their installation, and monitoring their functionality on the field once they are installed. They also discussed at length other existing threats to wildlife here such as the issue of free-ranging dogs and shared possible ideas to tackle these issues.

Additionally, Radheshyam continues to patrol the 50 sq. km. GIB habitat outside the demarcated area of the Desert National Park, Rajasthan, and document the rich wildlife of the region.

### CONSERVATION CULTURE IN ARUNACHAL

In November, Dechin Pema Saingmo and Pemba Tsering Romo traveled to Mago valley to visit Nyuri and Doori, two villages that lie in snow leopard habitat in Tawang district, Arunachal Pradesh. They were part of a larger team of colleagues at [WWF-India](#) and members of 'It's All Folk', a Jorhat (Assam)-based project to explore ways of working with locals to create modern products out of yak hair. People in the villages endure harsh weather conditions and live with limited access to proper motorable roads, electricity or schools, and herding yaks is the main livelihood.

The primary goal of this collaborative trip was to understand the possibility of

**VIRTUAL FAREWELL SESSION:** On December 22, 2022, Mud on Boots Project Coordinator Neyi Jamoh organised a virtual session for all project leaders to share experiences from their two-year term with the project. Vidya Venkatesh (Director, [Last Wilderness Foundation](#)), the special speaker for the session, inspired all participants by sharing her learnings from working on conservation initiatives with several communities in Central India. Cara Tejpal (Mud on Boots Founder and ex-Project Director) and Maitreyee Mujumdar (ex-Project Coordinator) also interacted with the project leaders.

creating modern products from yak hair to create a stable income source for the *brokpas*, and thereby support their nomadic herding lifestyle, which enables traditional practices that are beneficial to biodiversity conservation in the region. During the five-day long visit, the team interacted with many locals, organised a meeting to share the purpose of the visit, distributed solar lamps and polythene sheets for the construction of greenhouses, and provided five fox lights to locals.

The team then reached Thingbu village on November 18, 2022, and stayed at the village government school for four days. There the team conducted meetings with locals to get reviews on the fox lights that were distributed by WWF-India in September-October 2022 as part of their long-term project to conserve snow leopards and other high-altitude wildlife in western Arunachal Pradesh. Dechin and Pemba were elated to learn that the fox lights were proving beneficial in protecting livestock from predator attacks. Knowing that *brokpas* suffer huge losses on account of attacks by wild animals such as dholes, Himalayan black bears and snow leopards, the duo is hopeful that this simple intervention will play a key role in continuing human-wildlife coexistence in Tawang district, Arunachal Pradesh. 

### KEEP OUR BOOTS ON THE GROUND!

The Sanctuary Mud on Boots Project is fueled by public donations. If you find the conservation work that we enable to be meaningful, and consider our efforts to empower grassroots conservation initiatives worthwhile, please contribute any amount. You can donate online via our website: (<https://www.sanctuarynaturefoundation.org/>), or reach out to [neyi@sanctuaryasia.com](mailto:neyi@sanctuaryasia.com) for donations via cheque or bank transfer.



A female Great Indian Bustard in its natural grassland habitat in Jaisalmer, Rajasthan.



Dechin and Pemba interacted with locals in Mago Chu valley, Arunachal Pradesh.

# PROJECT UPDATES

## A Sanctuary Report – December & January

Notes, anecdotes and reports from Sanctuary Nature Foundation's projects across the country.

### BAJAJ ELECTRICAL'S SUPPORT FOR THE ANANT BAJAJ PARYAVARAN MITRA KIDS FOR TIGERS PROGRAMME

#### In Mumbai, Maharashtra

Kids for Tigers, supported by *Bajaj Electrical's Anant Bajaj Paryavaran Mitra*, conducted several audio-visual shows in schools across Mumbai. A hands-on butterfly garden-building session with excited kindergarten students of the Bombay International School was organised to educate students about the lifecycle of butterflies, plant-animal interactions, and to inculcate a love for plants and animals. The students were delighted to learn some amazing facts about butterflies.

A nature trail (third of the year), along with a 'Save the Tiger' event (second of the year) in collaboration with the Forest Department, was conducted at Rani Bagh, the popular name of the Veermata

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ABOVE Dr. Parvish Pandya of the Sanctuary Nature Foundation and Hutookshi Rustomfram of the Save Rani Bagh team regale students with interesting facts about the canon ball tree during the nature trail at Rani Bagh.

Jijabai Bhosale Vanaspatti Udyan Sangrahalaya – Mumbai's only heritage botanical garden. Students from registered Kids for Tigers' schools joined the trail. They were introduced to the city's tree diversity and given examples of plant-

animal interactions and interesting natural history tidbits. The trail was led by members of the Save Rani Bagh team. All participants received a book by children's author Katie Bagli. Post the trail, the kids also participated in a poster-making competition on 'What impressed me the most during the nature trail'. The event was attended by Revati Kulkarni Patil, Deputy Director (South) SGNP and Dr. Devanand Sirsat, Curator Zoo along with three forest guards, as well as Dr. Abhishek Nandkishor Neelam Satam, Zoo Biologist and Education and Public Relation Officer In-charge at the Botanical Garden and Zoo.

Art supplies for the poster-making competition were provided by *Sanctuary*. The first prize winner was given a BNHS student membership and a copy of Prabha Nair's '*So long, Amur Falcon*'. The second prize winner was given a copy of Rohan Chakravarty's '*Bird Business*', and the third prize winner was given a coffee mug from BNHS. All kids received a certificate of participation.

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ABOVE Students from various Mumbai schools participate in the Save the Tiger poster making competition organised by Kids for Tigers at Rani Bagh on January 14, 2023.

# HT PAREKH FOUNDATION SUPPORT FOR KIDS FOR TIGERS

## In Kolkata, West Bengal

A leopard cat makes its kill, a kingfisher feeds on its prey, a Plaintive Cuckoo digs out an insect, small-clawed otters fish in brackish waters... A few young kids, chosen to be tomorrow's environmental leaders, witnessed all these sightings and more within a span of three days at the Kids for Tigers residential camp in the Sundarban Tiger Reserve!

Post-pandemic, Kids for Tigers has been busy with a fun-filled tiger fest, four filled-with-discovery nature trails, audio-visual shows that revealed the wonders of wild India... and an annual camp in the heart of the largest mangrove forest in the world. Such were the delights to which students in schools registered for Kids for Tigers programme 2022-23 were treated. With the eight lucky students were eight teachers from different city schools, who woke to the calls of kingfishers, saw basking saltwater crocodiles and kept a sharp eye out for the elusive tiger. Down the years, we at Sanctuary have known that learning about the value of wild species and ecosystems is vastly improved with personal visits to wild India. The camp was planned and organised by Sanctuary's partners from SHER, Joydip and Suchandra Kundu and it proved to be an effective platform for our youngsters to experience a truly magical mangrove ecosystem. Guided by ace naturalist Nityananda Choukidar, the participants quietly learned how the mangrove forest helped to temper the worst impacts of climate change – a crucial ecological service for the megalopolis of distant Kolkata. Kids for Tigers' local coordinator young conservation-campaigner Manish Sarkar's work is helping young people to absorb a greater understanding of human-wildlife coexistence that has been passed down the generations to local communities. The young campers and their teachers learned about the tidal dynamics, and interacted with those who share physical space with tigers. To introduce the city-dwellers to the Sundarban ecosystem, the iconic folk play, *Bonobibi Paala* was staged.



ABOVE Students performing a skit at the Kids for Tigers' annual Tiger Fest in Kolkata.

The camp was concluded at the Bagh Bon Centre at Pakhiralay in the presence of Ajoy Kr. Das, CCF and Field Director of the Sundarban Tiger Reserve, who was accompanied by Avik Das, Range Officer of Sajnekhali Wildlife Sanctuary and Abhishek Dey, Deputy Ranger, West Bengal Forest Department. Before bidding goodbye, the teachers and students ceremoniously planted mangrove saplings (Kankra) at Bagh Bon as Field Director Ajoy Das looked on with pleasure at Kolkata's future tiger ambassadors.

For the benefit of children from scores of Kolkata schools, a Kids for Tigers' Fest was conducted on December 14, 2022 with over 450 students and teachers participating from as many as

41 Kolkata schools at the La Martiniere for Girls School. Here students presented performances on stage, all focused on tiger and nature conservation with a special emphasis on the Sundarban Biosphere ecosystem, including issues involving human-wildlife conflict. Posters, dance performances, music recitals, skits, short plays, elocution contests and recitations and a few fascinating power-point presentations on the theme 'Vote for the Tiger' were part of the fest. Every child received a certificate of participation and each attending school received a special Kids for Tigers' plaque, that was presented by the much-loved Suchandra Kundu, who happens to be the Honorary Wildlife Warden of Kolkata.



ABOVE Tiger Ambassadors from Kids for Tigers, Kolkata, accompanied by their teachers and forest officials, proudly show off their certificates.

## HT PAREKH FOUNDATION SUPPORT FOR COMMUNITY EVENTS

### In the Sundarban Biosphere Reserve, West Bengal

A series of well-planned activities were conducted at carefully chosen project sites in the Sundarban, including community interactions, forest guide training, a journalists meet, and more! Community interactions and film screenings continue in the Sundarban, and these are integral to connecting local communities, especially children, with issues concerning biodiversity protection and climate change.

It's been a rich year for young people of the Sundarban with night film screenings, Art for Conservation events taking place at Sundarban's Bali Island, where the Wildlife Protection Society of India (WPSI)'s Project Officer, Anil Krishna Mistry, who lives in and has spent his entire life in the Sundarban, organised a series of programmes for local villagers whose children participated in activities including creative art event, with one simple focus – the Sundarban Mangrove ecosystem and its star attraction, the tiger. Such events help bridge the gap between communities and the environment and help the local people

get a global perspective on our rapidly changing climate.

In the Sundarban Tiger Reserve, local communities and visitors are oriented by forest guides appointed by the West Bengal Forest Department. This is to ensure that such guides are armed with the requisite skills and knowledge – not just about the tiger, but also about the entire mangrove ecosystem along with its rich biodiversity, critical conservation issues, the manner in which climate change is impacting both people and wildlife, plus the challenges that lie ahead and are also being currently faced by human and non-human residents of the Sundarban. For these initiatives, Sanctuary partnered with their long-time associates WPSI, headed by [Belinda Wright](#), who was honoured with a special Sanctuary Tiger Award in 2005.

For the benefit of as many as 35 Sundarban forest guides, Sanctuary and WPSI organised a two-day training, with the support of the West Bengal Forest Department's Sundarban Tiger Reserve officials. The workshop was held at the Interpretation Centre, Sajnekhali Wildlife Sanctuary on December 10 and 11 and included indoor and outdoor sessions designed to empower these crucial ambassadors with guiding skills, nature etiquette, birdwatching techniques, climate change awareness, biodiversity

protection, and local conservation problems and solutions. The forest guides were addressed by Jones Justin, Deputy Field Director, Sundarban Tiger Reserve; Anil Mistry, WPSI; Prof. Shubhankar Banerjee, New Mexico University, U.S.A; and Dr. Parvish Pandya and Saurabh Sawant from the Sanctuary Nature Foundation. The interactive programme also focussed on the day-to-day problems guides encounter when dealing with tourists, and on creative ways to communicate information concerning conservation and the natural history interactions between wildlife. Such sessions not only help tourists get a perspective on the tough job that officials have, but also on how protecting the ecosystem ends up protecting people living far from the mangrove wonderlands. The long-term objective was not only to enhance the tourism experience, but to create more environment and conservation-savvy tourists who will respect and potentially help protect the Sundarban ecosystem.

Every participant at the workshop for forest guides was presented with a draft pocket-sized field guide and were asked to contribute their suggestions and corrections before the profusely illustrated guide was distributed to future visitors to one of the world's most iconic tiger geographies.

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ABOVE Dr. Parvish Pandya addresses naturalists during the two-day nature guide training programme organised by Sanctuary and Wildlife Protection Society of India (WPSI) with the support of the West Bengal Forest Department's Sundarban Tiger Reserve officials.

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ABOVE Students of Bali Dhanamani Model High School during a nature trail in the Sundarban Tiger Reserve.

# MORNINGSTAR-INDIA SUPPORT FOR KIDS FOR TIGERS' RANTHAMBORE VILLAGE CONTACT PROGRAMME

## In and around the Ranthambore Tiger Reserve, Rajasthan

Sanctuary's Kids for Tigers programme, supported by *Morningstar-India*, works in 45 villages located in the periphery of the Ranthambore Tiger Reserve. Here, over two decades of consistent work by Govardhan Meena, one of the most popular people, much-loved by village children and much-admired by Ranthambore's forest officials, has yielded results in the shape and form of vastly improved people-park relationships. Additionally, a series of activities are held every week involving clean ups, wildlife conservation activities, reduction of human-animal conflict, health camps (during the pandemic) and regular visits into the park in coordination with the support of the Rajasthan Forest Department/Ranthambore Tiger Reserve staff. In response to suggestions received from local youth, two Sanctuary Computer Laboratories have been set up in villages surrounding the Ranthambore Tiger Reserve. The objective? To impart skills involving learning English and how to use computers to open doors for online jobs and livelihood opportunities. As many as 50 young village girls and boys registered for the training for the Rajasthan State

Certificate Course in Information Technology (RS-CIT). A total of 50 students appeared for the exam held on January 22, 2023.

Regular film screenings were organised through Sanctuary's mobile education van to familiarise young and old alike about tiger conservation. Such sessions were held both in schools and in 45 Ranthambore villages. With winter approaching, sweaters and gloves were gifted to government school students in December and January. What was very heartening was the fact that when young children enrolled for clean-up drives, some of their elders joined the initiatives as did forest officials who accompanied the group to offer security and advice. A primary

result has been a greater awareness of the dangers of single-use and disposable plastic waste. We saw children explaining to adults how hazardous plastics can be when ingested by wild or domestic animals. The activities conducted are almost too numerous to list and include travelling wildlife poster exhibitions on the biodiversity of Ranthambore in schools, drawing competitions, wildlife quizzes and *nukkad natak* events themed on tiger conservation. Throughout the month, visits were also organised to nearby museums in the company of Forest Department staff, the frontline workers defending and protecting our forests, most of whom live in the villages where the programmes are implemented.



ABOVE Local students perform a nukkad natak (skit) on tiger conservation to educate their peers about the threats tigers face.



ABOVE Jersey distribution to local kids to keep them warm during the harsh winters of Ranthambore.



ABOVE An image can tell a story better and louder than words ever can. Kids appreciate a photo at the Wildlife Photography Exhibiton held in their school.

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SANCTUARY PHOTOLIBRARY

## INDUSIND BANK SUPPORT FOR KIDS FOR TIGERS

### In Six Locations Across India

In Bengaluru, Coimbatore, Delhi, Hyderabad, Nagpur and Khajuraho/Panna a series of Kids for Tigers' initiatives are being supported by long-time Sanctuary partners, the *IndusInd Bank*. By working with diverse supporters, Sanctuary is managing to help children overcome the frustration of two pandemic years, even as their legitimacy and strength adds to the national objective of protecting our rivers, forests and wildlife. By infusing nature appreciation and a conservation ethic in children, we expect to create a new generation of urban and rural

children, far more sensitive to nature than generations gone by. Using the tiger – our national animal – as a metaphor for all of nature, the Kids for Tigers Network across India now exceeds a million young children, their teachers, parents, and the communities in which they live. Designed by educationists, the programme has been recognised across the world. A carefully curated series of Teachers' Environmental Leadership Workshops have been held in Nagpur, Delhi, Bengaluru, Hyderabad, Khajuraho/Panna and Coimbatore. In these centres, exciting and educative nature trails and wildlife events have drawn hundreds of people, young and old, who are exposed to critical connections between biodiversity protection and conservation, food, water and economic security and climate change.

### In Nagpur, Maharashtra

Over a decade ago, a strong Sanctuary supporter, Hemendra Kothari, christened Nagpur as the Tiger Capital of India. Here we continue the inspirational Kids for Tigers' work launched by the late Sulabha Chakravarty. By working with both vernacular and English medium schools, our message conveys that humans are as dependent on the biosphere as are the animals we wish to protect. [Pandurang Pakhale](#), Assistant Conservator of Forest and Sanctuary Wildlife Service Awardee 2017, said he was delighted to interact with Kids for Tigers' children who were conducted through the naturally exquisite surrounds of the Balasaheb Thackeray Gorewada International Zoological Park where they were able to birdwatch and learn about the plant and animal life of wilderness areas of Vidharba, Maharashtra. Slide shows, nature walks, tiger fests, and even an overnight camp lie in store for the children of this magical wildlife-rich city.

### In New Delhi

A hugely successful Teachers' Workshop for Delhi was conducted at Springdales School, Pusa Road, with teachers braving the December cold and fog to participate in the event. Bhavya Arora, Kids for Tigers, Delhi Coordinator, conducted the audio-visual show. The workshop was graced by chief guest [Neha Sinha](#), author, environmentalist, and Sanctuary Wildlife Service Awardee 2017, who spoke about the natural heritage and biodiversity in Delhi. Teachers felt highly motivated after these sessions and wanted to implement the practical lessons they learned

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ABOVE Students were enthralled to learn about anthills during their nature trail at the Gorewada Zoological Park.

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ABOVE Teachers at the Delhi Kids for Tigers' Environmental Leadership Workshop with chief guest Neha Sinha and Delhi coordinator Bhavya Arora.



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parents and relatives of others are engaged with nature-based tourism. Here with Dr. Raghunandan Chundawat and wildlife chronicler and photographer Joanna Van Gruisen, both children and their parents are engaged in ways to deal with human-wildlife conflict. Inculcating knowledge and appreciation for the services that healthy forests offer communities is also a key part of the agenda. In the coming years, we expect that Panna will become a source of key biodiversity-climate education for India.

### In Hyderabad, Telangana

A nature trail and Teachers' Environmental Leadership Workshop have been completed. The nature trail was conducted at the Butterfly Park of Sanjeevaiah Children's Park. B. Srinivas, IFS, interacted with the students and enlightened them with various facts about wildlife, plant-animal interactions, and much more. A workshop was also conducted for teachers, to inspire them to integrate environmental education into subjects they teach.

### In Bengaluru, Karnataka

Several audio-visual shows, one nature trail and the Teachers' Environmental Leadership Workshop have been completed. The Teachers' Workshop was conducted at Venkatappa Art Gallery Auditorium, and was attended by 34 teachers from 18 schools with chief guest being S. Karthikeyan, Chief Naturalist, Jungle Lodges and Resorts. Teachers enjoyed the informative sessions, which also included an audio-visual show. The new year started with more audio-visual shows and a nature walk. A tiger fest was held in the city on January 27. 🐯

ABOVE A Kids for Tigers' audio-visual show was conducted at Government Middle School, Mandala.

about wildlife, nature and environment conservation in their schools.

### In Coimbatore, Tamil Nadu

With help from wildlife veteran Mohammed Saleem, Co-Founder of the Environment Conservation Group, a nonprofit NGO, Kids for Tigers has activated both aided and unaided schools in this city around which some of India's finest wildlife destinations exist, including the famous Silent Valley National Park, Topslip, Anamalai, Valparai and more. School Principals have warmed up to the Kids for Tigers' mission and have invited us to address the entire student and teacher communities at school assemblies. Slide shows, nature walks, conservation notice boards, tiger fests and an overnight camp are all part of the buffet of nature experiences that the children and teachers are being

exposed to. All the above are part of agenda of the Teachers' Environmental Leadership Workshop where educationists help to craft the communications that will be relayed to tomorrow's citizens.

### In Khajuraho and Panna, Madhya Pradesh

Khajuraho, next to the Panna Tiger Reserve, through which the exquisite Ken river flows, is one of the newest Kids for Tigers' centres. Here our focus is primarily on small local and government-aided schools that work with underprivileged children. Such children are all too often excluded from environmental education, despite the immense need to connect them with nature... particularly those living in proximity to biodiversity-rich areas such as the Panna National Park. Many families are in fact employed with the Panna Tiger Reserve and



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ABOVE A Kids for Tigers audio-visual show was conducted at TRG Matriculation School by Md. Saleem, Coimbatore Coordinator.



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ABOVE Nitin Prabhakar introducing kids to India's biodiversity during the audio-visual show at Air Force School, Hebbal.



# Flowers in Unusual Places

**O**n a recent trip to South India, my botanist mind reeled at the turn of every street corner, which seemed to offer up all kinds of tropical treasures. Towering jackfruit trees *Artocarpus heterophyllus* with their trunks laden with stout fruit; dainty bilimbi trees *Averrhoa bilimbi*, their canopy of downy, pinnate leaves protecting the fruit ripening along their branches; umbrella-like Ficus canopies teeming with birds and fruit bats; and finally, the exquisite flowers of the cannonball tree *Couroupita guianensis* filling a quiet corner of a local park with a sweet, heady perfume. My father remarked how odd it was that the bilimbi bore fruit directly from its trunk, and suddenly all the diverse trees I had observed revealed a common feature: cauliflory. I began to wonder how these trees from different continents and botanical families had all evolved this one distinctive feature – and whether it served the same purpose for each species.

A botanical term coming from the Latin words for ‘stem’ and ‘flower’, cauliflory refers to a plant species, which flowers and fruits directly from its trunk or woody branches, as opposed to flowering from tender, apical growth like in most plants. Over a hundred plant species from some 15 different families show cauliflory, and they are almost exclusively restricted to the tropics. This offers the first clue as to why this behaviour evolved. Tropical rainforest biomes are distinctly vertically stratified, which means starkly different animals and insects occupy the canopy, the mid-layers, and the understory of a forest. By flowering from the stem, cauliflorous plants open themselves to interactions with a completely different set of animals, such as insects, reptiles, bats, rodents and primates that can inhabit all, or part of the trunk, and can aid in pollination or seed dispersal. Interestingly, trunk-dwelling animals are not a specialised group, so cauliflory actively encourages generalist interactions – a trend opposite to many hyper-specific tropical species such as in orchid pollination. By promoting generalist behaviour, cauliflory increases the number of species a plant can interact

with, effectively increasing its allies in the fight for survival. Therefore, the bilimbi’s dark, musky flowers can be pollinated by flies and gnats in the understory, and Ficus species can recruit ground-dwelling ant species to guard their developing fruit against predators.

There is another trend in cauliflorous species, and that is of almost impractically large and heavy fruit. Take a look at a massive jackfruit, or the weapon-like fruits of the cannonball and calabash *Crescentia cujete* trees and the pattern becomes apparent. Ecologists have suggested that evolving to be cauliflorous may allow a plant to grow larger fruit, which have direct access to water and nutrients through the trunk and could not otherwise be supported on slender branches. This provides the advantage of being able to recruit larger mammals such as peccaries, tapir, elephants, and monkeys to disperse seeds. It also means investing more resources in fewer offspring, to ensure better chances for their survival. However, it has also been suggested that having large fruits in the first place could have acted as a driver for plants to evolve cauliflory – a theory that reverses the cause and effect of the phenomenon. In either case, cauliflory is a unique adaptation that evolved in response to an extremely challenging environment which became so successful, that it evolved repeatedly across plant lineages – a classic example of convergent evolution. Many ecologically, agriculturally and culturally significant species are cauliflorous: jackfruit, durian, cacao, starfruit... the list goes on. These species underscore the timeless evolutionary processes that have shaped the plants we enjoy, and often take for granted today. 

#### Further reading:

- Sharma, Santosh Kumar. ‘Cauliflory and the Cannonball Tree.’ *Science Reporter*, June 2011, pp. 53–55., [https://doi.org/https://www.researchgate.net/publication/335137859\\_Cauliflory\\_and\\_Cannonball\\_Tree](https://doi.org/https://www.researchgate.net/publication/335137859_Cauliflory_and_Cannonball_Tree).
- Warren, John M., et al. ‘Reproductive Allocation and Pollinator Distributions in Cauliflorous Trees in Trinidad.’ *Journal of Tropical Ecology*, Vol. 13, No. 3, 1997, pp. 337–345., <https://doi.org/10.1017/s0266467400010543>.



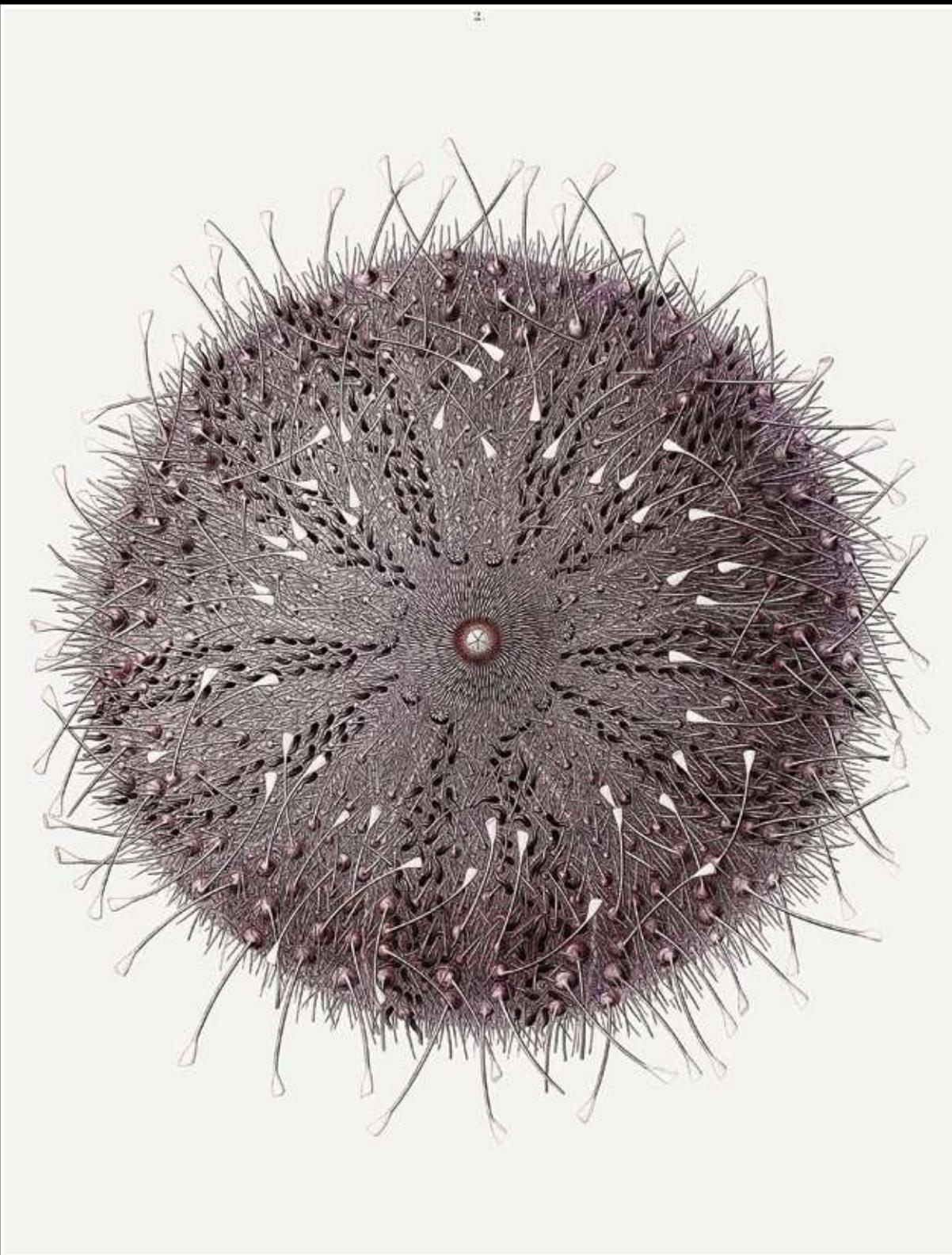
By Soham Kacker

**Soham Kacker** is passionate about plants and has apprenticed at the Auroville Botanical Gardens and the Aravalli Biodiversity Park. Based in New Delhi, he is currently a research student at Ashoka University, focusing on plant ecology and conservation.



ABOVE The cannonball tree *Couroupita guianensis* sports exquisite flowers and perfectly spherical fruit directly on the trunk.

FACING PAGE Over a hundred plant species from some 15 different families show cauliflory, including the dainty bilimbi *Averrhoa bilimbi*.



The prickly, globular sea urchin resides on the hard ocean floor. There are over 900 species of these marine invertebrates, generally 2.5 to 10 cm. in size. The species illustrated above is a *Sperosoma grimaldii*, first described in 1897 by R. Koehler. The sea urchin's body is covered with slender sucker-tipped tubular feet, hundreds of movable spines, and small pincers. Its mouth, located on its underside, is equipped with an 'Aristotle's lantern' – five teeth-like plates that close like a beak. The sharp teeth move in different directions to graze on algae, which grows on surfaces such as corals. In the absence of predators such as sea stars, an exploding population of sea urchins could destroy kelp forests.

# THE SANCTUARY PAPERS

BY SHATAKSHI GAWADE

## FEELING CRABBY

The scuttling crab completely scrambles our understanding of evolution – it is not linear, neat or unidirectional. Unlike humans, who evolved from apes just once, different animals in the same group evolved into crabs not twice, not thrice, but *five* different times. This march towards the same crabby characteristics is known as carcinisation, which is a type of convergent evolution (it takes place when species adapt in similar ways and occupy the same ecological niche).

The decapod family of crustaceans – to which crabs belong – have five distinct strands that have evolved in this convergent manner to have the crabby body: claws, 10 legs, and a small, flat and sturdy abdomen. Evolutionary paleobiologist Matthew Wills believes such convergence indicates that this particular body shape is well suited to ocean habitats.

And to add to the scramble – some crabs have devolved (un-evolved) when changes didn't seem to work, and also re-evolved when the devolution didn't prove to be beneficial! An example of decarinisation can be seen in frog crabs *Raninoidea*, of which there are 46 living species. Rapid climate change in recent

decades has been a trigger for dramatic adaptations in some species such as the hermit crab, enough to qualify the evolved forms as new species. After all, isn't change the only constant?

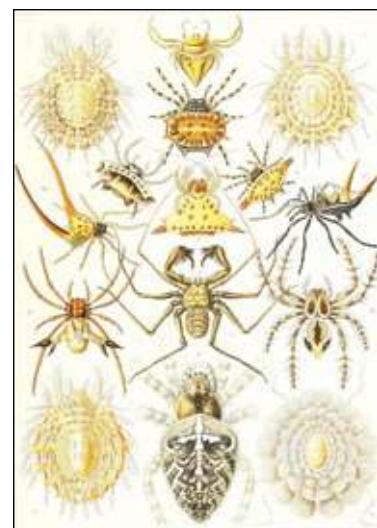


## JUMPING FOR LIFE

While rapid in evolutionary terms can still encompass several decades, the male of the orb-weaving spider does not have so much time to save itself. In fact, it lives on the edge of life and death every time it mates, and is among the few males that can be excused for leaving right after sex.

Female orb-weaving spiders practise sexual cannibalism – the male is captured and eaten instantly after mating. To avoid this unsatisfactory end, the male catapults off the female in a split-second after copulating, using energy stored in its front legs. In human terms, this would translate into a 1.8 m. tall man catapulting 530 m. in less than a second. To achieve this jump, the spider folds the tibia-metatarsus joint of its first leg pair, which exerts tremendous hydraulic pressure and makes the legs expand when released.

The male orb-weaver pulls off the female with an acceleration of 20Gs i.e. 20 times the acceleration felt during free fall, spinning at 175 revolutions per second as it soars to safety. But that isn't the end of the romp – the male returns to the same female up to six times, repeatedly using a silky strand to climb back up and catapult off. Zhang Shichang, researcher and lead author of this orb-weaver spider study, believes that females of this species judge the quality of a male's genes by his ability to catapult. She may accept his sperm only after he passes the test, despite having mated before. The female orb spider literally has the male jumping through hoops!



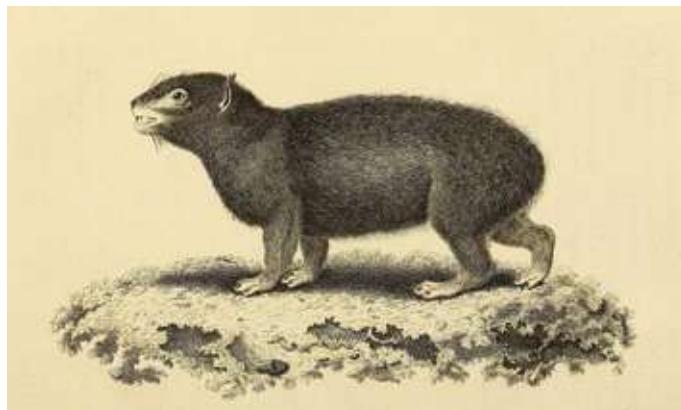
### Did You Know?

*Gulls get cold feet, and they are okay with it! In an ingenious adaptation to save energy in extremely cold weather, they let their feet approach freezing temperatures. Gulls use a countercurrent heat exchange system wherein warm blood is supplied to the feet and cool blood is brought back to the arteries. It also helps that their feet have few muscles and nerve tissues.*

## ROCK-ING HYRAXES

Here's a less exhausting tale of courtships in the animal world – a female rock hyrax *Procavia capensis*, a terrestrial mammal, chooses her mate depending on his musical abilities!

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Researchers have surmised that the female connects strong genes and good health with the male rock hyrax's singing abilities. Males that sing more also seem to have more surviving offspring. The songs the rock hyrax makes have many patterns that are common in human music and language. Their songs also have regional dialects, so individuals living closer together sing more like each other. Researchers also observed that the rock hyrax's singing has a set structure – the song gets louder as it progresses (as in a crescendo), and the end is more complex, likely to keep its audience's attention. The sounds in its music occur at regular intervals; this is known as isochronous rhythm. But if the male is not healthy, it is reflected in his singing, which the female can pick up on.

The rock hyrax is found in scrub-covered areas, and is native to parts of the Middle East and Africa. It is commonly known as *dassie* in South Africa. Though it looks like a rodent, its closest living relatives are the elephant and manatee! Its upper incisors grow into two tusks.

## WHAT'S ON THE INSIDE?

While rock hyraxes decide to reproduce based on musical talents, the kākāpō – a species of parrot that is flightless – breeds when its favourite fruit tree, the rumi tree, has a bumper crop. This happens only once in four years. This unusual behaviour is partly responsible for the dire condition this species is in. Endemic to some islands of New Zealand, even the 'critically endangered' tag given to the kākāpō feels blithe, considering there are only 116 mature individuals of the *Strigops habroptilus* left in the wild. This nocturnal, whiskered, tree-climbing creature seems to take each step after considerable deliberation, as if weighed down by its predicament. New Zealand wildlife officials are hard at work managing this small clutch now. The arrival of humans on the islands is also responsible for its decline as they were hunted for meat, kept in captivity as pets, and killed by predators such as rats and cats, and their habitats were destroyed.

Researchers recently looked at what's inside the kākāpō, and found that its gut microbiome consists almost entirely of the bacterium *Escherichia coli*. While the jury is still out on whether this is good or bad, such homogeneity may mean that the species cannot carry out all its functions. Studies of other fragmented or small populations have shown similar results – a loss of microbial diversity. Not being in the wilderness, exposure to humans, and change in environment and climate change can all alter an animal's microbiome, often negatively. Microbiome analysis and engineering is now being used to conserve species, and could come in handy for

the slow-breeding kākāpō too. Tracking changes in the microbiome profile could help conservationists tailor strategies for it.

PUBLIC DOMAIN

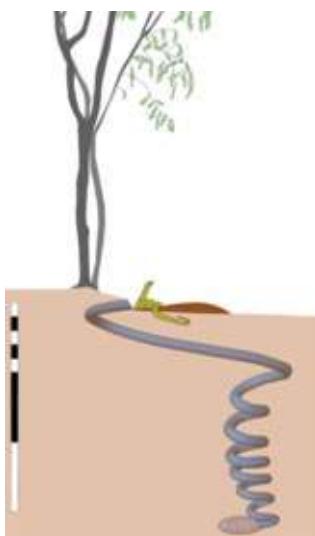


### Did You Know?

*The dragonfly, and other small flying species such as blow flies, perceive time super quickly. Dragonflies can see changes at 300 Hertz (300 times/second); humans, meanwhile, can see at 65 Hz. At 0.7 Hz, crown-of-thorns starfish have the slowest eyes. Fast vision helps species move quickly or track the path of prey – aquatic predators have faster time perception than terrestrial predators.*

## THE SPIRAL OF LIFE

PUBLIC DOMAIN



In Australia, a mysterious creature is spiralling its way into the future – the predatory yellow-spotted goanna *Varanus panoptes*. Though it occupies a range the size of Europe, it is barely spotted. Goannas have been in Australia for 15 million years; there are currently 27 extant species in the nation, most of which are carnivorous. While these lizards dig holes or burrows for their eggs, the nest of the yellow-spotted goanna is particularly interesting.

The female of this 1.5-m.-long monitor lizard digs complex shelters in the shape of a helix, which are as deep as four metres. The expecting mother spends seven to ten days making this crèche for her eggs, ensuring they will be protected from the heat in northern Australia. She remains buried during the entire excavation process. At this depth, the clutch is protected by moist and cool soil for its incubation period of eight months. The newly-hatched babies, however, don't follow in their mother's path just yet. They make their way to the surface straight up, punching through the layer of soil.

After the little ones leave, the yellow-spotted goanna's hard work serves yet another purpose – the eventual collapse of the helical burrow gives rise to a variety of nooks and crannies, which are occupied by other reptiles, frogs and insects. The yellow-spotted goanna thus acts as an unwitting ecosystem engineer.

## UNPARALLELED ECOSYSTEM

Speaking of ecosystems, who wouldn't love the ability to travel through time to experience a recently-discovered, two-million-year-old ecosystem in the farthest northern reaches of Greenland, which reveals what life was like when the Earth was in a warmer period? Today, this region is a harsh polar desert, but back then it was a forested coastline with a river flowing into an estuary. Intriguingly, the species once found here still survive in recent times in the Arctic environment and temperate boreal forests. However, there is no existing parallel for such an ecosystem!

These findings were derived from DNA found in Peary Land, a peninsula in northern Greenland, in a fossil-rich rock formation called Kap København. The temperature then was 11 to 19 degrees higher, and the area was completely dark for nearly half the year. The latest analysis reveals that this bubble of life supported 102 plant genera and nine species of animals such as mastodons, hares and horseshoe crabs. Birch and willow trees dominated this ancient landscape – trees found only in southern Greenland today. Researchers believe

the survival of these species in such a climate is testimony to evolutionary adaptation.

Wouldn't it be extraordinary to travel through time and visit these ancient ecosystems and look at the incredible diversity of life there? Nevertheless, we can contend ourselves with our imagination, and take action to prevent ecosystems that exist today from soon becoming a relic.



PUBLIC DOMAIN/BETH ZAIKIN/JPG

### Did You Know?

*Pops that kill – yup, that's the snapping shrimp's chosen weapon to protect its territory and hunt. These crustaceans snap their asymmetrical claws rapidly to create bubbles, which on bursting send shock waves that stun or kill prey and intruders by causing trauma to soft tissue. An orbital hood protects the attacking shrimp's brain by dampening the pressure by up to 75 per cent.*



# GIVE WALAYAR'S ELEPHANTS THE RIGHT OF WAY

The tragic incident of the death of two wild elephants *Elephas maximus* near Walayar after being hit by a train has set ablaze a series of arguments that have re-emerged after years of silence. Thirty such cases of wildlife deaths across the Kerala-Tamil Nadu border lurk behind this silent period of continued injustice on these pachyderms. This particular incident in Kerala's Walayar town in the Palakkad district, the first to be reported in the past three years in Kerala, revived the attention of media, environmentalists and the government, including that of the Forest and Railway Department. The apathy toward wild animal safety, particularly that of the endangered Asian elephant, in a terrain that is known to be its stronghold, shone a spotlight on an issue that the authorities wanted to keep away from the public eye. This is precisely why the history of this issue needs to be explored.

The Western Ghats, identified as a biodiversity hotspot, runs parallel to the Western coast of the Indian Subcontinent for approximately 1,600 km. This mountain chain is interrupted only by a few geographical gaps, of which the Palakkad gap is the largest, separating the mountains by about 40 km. While this creates a natural barrier for the dispersal of wildlife, humans have been



By Arul Badusha and Abhijith A. V.



ABOVE Elephants cross the busy Kanjikode-Walayar railway line, which runs across prime forest land that houses vital water resources for migrating elephants.

taking advantage of this relatively plain terrain to establish linear infrastructures, including roads and railway lines, to facilitate trade and transportation. This is almost routine in India today, but this particular case is unique.

The Palakkad gap, which creates an abrupt blockage on the migrating routes of the Asian elephant, results in large-scale gatherings of these gentle giants in and around Walayar. The railway track (the A-line) that cuts through this critical habitat was established by the British in 1861. Water scarcity and intrusive agricultural practices in surrounding areas that were once relatively undisturbed has forced the elephants to move into a human-dominated landscape. The resultant conflict was, therefore, a predictable outcome, and the railway tracks added to the existing trauma for the elephants. As if this were not enough, another 23 km.-long B-lane was commissioned in 1974 between Walayar and Kanjikode by levelling and demolishing the steep mountain slopes.

The area encapsulated by these lanes includes a forest stretch that covers an area of about two square kilometres, like an island, which houses vital water resources for migrating elephants. With over 100 trains plying here every day, the elephants are now required to make this perilous journey across the two tracks to quench their thirst. To add to this problem, the current layout of the two tracks – more often than not – causes the pachyderms to be trapped in this artificially created forest island at the risk of life and limb. This is why the number of elephant deaths in the area have risen.

The Forest Department has tried to address the issue by setting up geo-fencing combined with animal monitoring systems. These include the installation of Artificial Intelligence (AI) visual census, smart motion-detection cameras, solar fencing, watch towers, and the deployment of patrolling teams to survey the landscape. Concerned with elephant mortality, the Madras High Court ordered the trains to maintain a maximum speed of 65 kmph. and 45 kmph. during the morning and night hours. Despite such measures, elephant deaths continue to rise. Clearly, the Forest and the Railway Departments will need to adopt better and different strategies to save the elephants.

A group of environmentalists including the members of the Wayanad *Prakriti Samrakshana Samiti* have intervened, expressing concern for the ineffective protocols put in place by both the Forest and Railway Departments. The group organised a march to the Railway Divisional Manager's office at Palakkad on November 4, 2022, and presented a series of suggestions including the establishment of under or overpasses. But these are going to take a long time to put in place. In the interim, a suggestion has been made to reduce the speed of trains to 30 kmph. along this stretch, together with diverting trains to the A-line, to reduce the risk of elephant mortality. 🐘

**The Sanctuary Nature Foundation wholeheartedly endorses the appeals made by the group of environmentalists of Walayar. Public opinion makes a huge difference and we urge *Sanctuary Asia* readers to add their strength to that of others working to keep elephants safe by writing a polite, but unambiguous letter to the authorities:**

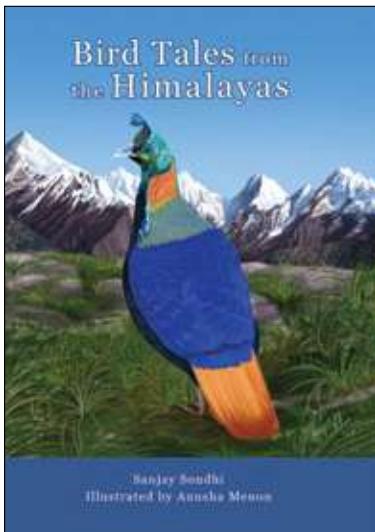
1. Send an email to the Hon. Minister Railways, Shri Ashwini Vaishnav, with a copy to the Divisional Manager's office, Palakkad asking them to a) reduce the speed of trains along this route and b) divert trains that do not need to halt at the nearby station.
2. Write to the Minister of Environment, Forest and Climate Change at [mefcc@gov.in](mailto:mefcc@gov.in) and the Minister of Railways at [officeofmr@gov.in](mailto:officeofmr@gov.in) asking that the above terms and conditions be conveyed to the [Minister of Railways](#) insisting that thorough scientific studies be conducted for future railway projects through and near wildlife areas. The plan must include under and over passes, depending on the nature of the animals using that specific route.
3. Do feel free to share copies of your mail on your social media handles and copy the authors and Sanctuary.

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**Arul Badusha and Abhijith A. V.** are environmental activists based in Wayanad, Kerala. They work on various conservation activities in and around Wayanad, other parts of Kerala, and the neighbouring states of Karnataka and Tamil Nadu.

# BOOK REVIEWS

With improved technology and a much greater appetite among the young for books to remind them of the wonderful biosphere in which they live, it is heartening to see how many new, high-quality publications are emerging from within India. Here are two books that Sanctuary believes should be in every public library and in the homes of all those whose hearts beat to nature's drum.



**BIRD TALES FROM  
THE HIMALAYAS**  
**Written by Sanjay  
Sondhi and illustrated  
by Anusha Menon.**  
**Published by Titli Trust  
(2022), Funded by DBS  
Bank and CEDAR.**  
**Paperback, 104 pages,  
Rs. 400/-**

Any book that combines folk tales, personal anecdotes and scientific facts about nature has to be a winner. This is one such, presenting over 50 species of birds found in the Himalaya.

Sanjay Sondhi's 'Doon Watch' column in *Hindustan Times*, spanning about 500 weekly articles, set high standards on what nature reporting could mean, somewhat in the tradition of naturalist and writer [M. Krishnan](#). This book builds partly on that series, and on the author's innumerable travels through the western and eastern Himalaya.

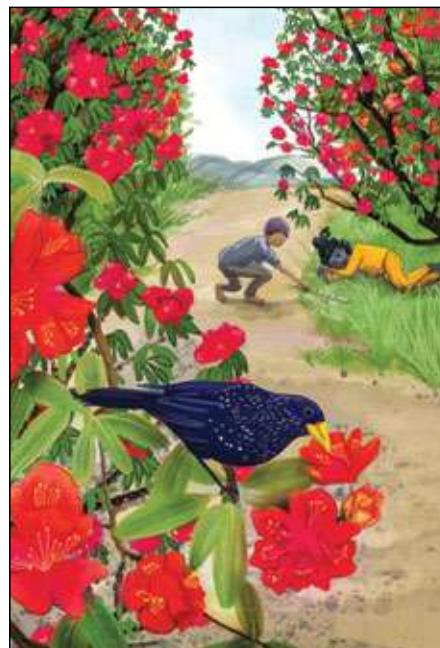
The book has 50 entries, each dedicated to a bird species or in some cases, a group of closely related species. The descriptions are a mix of facts regarding their status, range, behaviour, and so on; meanings of their local and scientific names; tales from communities or from ancient traditions (many collected from friends and nature guides, whom the author acknowledges); and anecdotes from Sondhi's birding forays. Since the scientific facts are easily found in many other books and on the internet, it is the folk tales and cultural associations, and his own encounters with these birds, that make this volume especially interesting and lively.

There are funny and joyful tales, such as the one about both the (human!) drunkard and Common Myna being called *sitaula* because of their supposed habit of promising not to repeat their behaviour. But there are also sad and melancholy ones, such as how the *kaafsal paku* – call of the Indian cuckoo – is that of a girl who

was wrongly accused of eating the *kaafal* berries that were to be sold, and beaten so badly she died, going on to become a cuckoo plaintively calling out to remind its mother of its innocence. Always, the stories inspire, and impart lessons for us to learn from. In the entry on the Black Francolin, we hear about a dispute between a Hindu priest, a Muslim mullah, a *paan*-maker and a vegetable vendor, each insisting on their own interpretation of the call of the bird, and how a wise person settles the dispute by saying that each is entitled to their own interpretation as long as they don't impose it on anyone else. Wise words indeed for today's religiously fraught atmosphere!

Also very interesting are the meanings of local and scientific names, sprinkled through the book. The Rufous Treepie, for instance, is called *taka chor* for its habit of picking up shiny objects like coins and lining its nest with them. Some of the most fascinating are the *Lepcha* names (from Sikkim), of which the book has many.

The engaging text is taken to a new height by Anusha Menon's wonderful colour illustrations. This young artist from Pune illustrated one of my children's books a few years ago, and I can see that her skills, already quite evident then, are even more well-honed now. There is accuracy in the depiction of each species, but excitingly, the illustrations also manage to depict the anecdotes or folk tales that Sondhi has described. Remarkably, she made them without going out to these regions; as she says: "I did the illustrations remotely from Pune,



The Whistling Schoolboy

## Blue Whistling Thrush

My first encounter with the Blue Whistling Thrush was an unforgettable one. It was May 1987. I was trudging my way back to the guest hall at Dalmahie in Humaloti Panchayat. Those were early days into birdwatching. I was a 'switcher'. Snuggled under the blankets, I could hardly hearches; whistles outside the house as usual. 'A hen going to school, whistling on the way home and laid eggs already.' When I stepped outside, the sound of the Blue Whistling Thrush's continuous, alternating song began to function. 'How on earth could I sleep going to school at six am?' I asked myself. Blowing myself cool, I continued slogging. Li still behind, singing away on the table in the garden shed was a Blue Whistling Thrush with a yellow breast. The Blue Whistling Thrush is a common resident throughout the Indian Subcontinent, from the Malabar Coast to the Arakan Yoma in the Western Ghats. Both thrushes have a human-like maddening song, going from the mumble, the whistling whimbrels.

The Blue Whistling Thrush is widespread across the Himalayas. It breeds in the eastern mountains, typically between 1,200 and 3,600 m, but descends to the foothills at the winter. In Dalmahie, it arrives in its hunting seasonality in early October like clockwork, and stays with us right through to the next summer. The Blue Whistling Thrush has a varied diet. It feeds on insects, especially on fruits and berries, flower nectar as well as insects, grubs, seeds, arthropods and other small脊椎动物. Often, when the birds alight on the ground, it will richly spread and fan its tail. It prefers streams in well-wooded areas and caravans but is also seen on Sarus tracks and at gardens with sufficient foliage. When the birds alight on the ground, they will fan their tails and then either other birds, known to feed on its excretions. Around this time, I find its birdfeeder filled with Pheasant droppings powder!

It is locally called the *lauron*. Lord Edwin had it that Lord Krishna was walking along a river bank in the Himalayas. Tired, he fell down on the path. While he was asleep, a young boy led by one Lord Krishnadas and nine others, ate the big meal worn on his plate. When Lord Krishna woke up, he was enraged to find his plate empty. He asked the boy who had eaten his food, where they were. The boy said, "The Blue Whistling Thrushes sing, 4 doors away from here." And so the Blue Whistling Thrushes sing, 4 doors away from here, just like someone who has not quite learnt to play the flute. Further, the white spots on the Blue Whistling Thrushes are said to be "Suresh marks"; Lord Krishna was very fond of Suresh.



#### **Blue Whistling Thrush**

Year: 1999  
Page: 10  
Title: Annual self-assessment report  
Page: 10

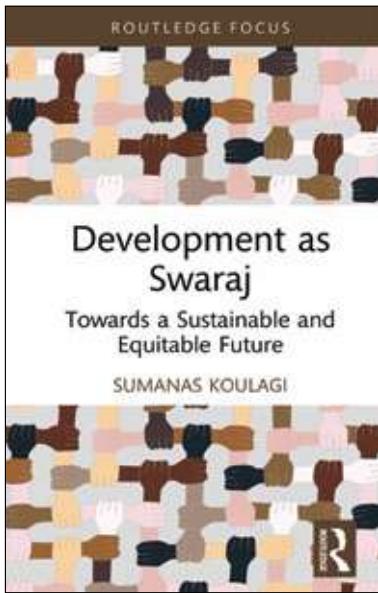
referring to the brilliant photographs Sanjay provided me with.” It is relevant also to mention here that the author deliberately chose to go with illustrations instead of photographs, and that works very well to bring out the combination of anecdote, folk tale and fact.

I do have a few quibbles. There could have been sharper editing, to iron out grammatical errors (not too many!), and stylistic issues such as a tad bit of repetition. The side notes on each page (which is divided into two columns) are interesting, but not consistent on what they contain – sometimes scientific fact, sometimes explanations about regional names, and sometimes folklore. It is not quite clear what the intent behind this side column is; if it had one kind of subject, it would have been more useful. The bottom right-hand side of the text page

has useful facts about the bird, such as its size, range and status, but the term ‘WLPA’, which refers to its level of protection in India’s *Wild Life (Protection) Act*, is not explained. Some of the birds have mythological snippets or folktales that are generally from India, but not specifically from the Himalaya, which is a bit odd in a book with this title. Though much of the text is quite simple and therefore accessible to a wide audience, occasionally unexplained scientific jargon slips through, for example, ‘sexual dimorphism’ used in reference to the Red Avadavat.

But these are minor annoyances in a book that is otherwise a delight, worth dipping into by anyone even remotely interested in the Himalaya, in birds and nature, in folktales and mythology, and in culture-nature connections.

**Reviewed by Ashish Kothari, Kalpvriksh.**



**DEVELOPMENT AS SWARAJ: TOWARDS A SUSTAINABLE AND EQUITABLE FUTURE**  
**By Soumanas Koulagi.**  
**Published by Taylor & Francis (2023). Hardcover, 168 pages, Rs. 4,840/-**

The documentary *Story of Stuff* shows the immense impact of the economy on the environment. As the skulls denoting toxic fumes float into the sky in the film, one is left wondering if there will ever be a way of living to protect nature from our waste, while also allowing for a true exploration of life.

In India, we needn’t look far. M. K. Gandhi propounded the idea of ‘*Swaraj*’ – self-rule, in his book *Hind Swaraj* in 1909, to empower the country to build a social framework based on decentralisation, which inherently has a smaller ecological footprint. Between Gandhi and economist J. C. Kumarappa, his close associate, we have a system that focuses on interconnected human evolution and reduced environmental impact.

Sumanas Koulagi’s book draws from the work of these two giants – Gandhi, the patron saint of the environment and Kumarappa, the green voice. The book is an extended version of his Ph.D. dissertation, and the theoretical academic analysis is beautifully complemented by his work with the Janapada Seva Trust’s Khadi Initiative. The book reads like the result of a deeply personal journey informed by careful social and ecological observations, on how to fulfil life’s purpose without harming the environment and human rights.

Sumanas uses *khadi*, the hand spun and hand-woven cotton fabric that Gandhi recommended during the Freedom Struggle, to analyse existing development models. Development is an intentional act, he writes; I suppose it is a verb and not a noun, much like love. Sumanas talks about the limitations of different

development systems such as the Sustainable Development Goals, Ubuntu, and Gross National Happiness, and arrives at the Swaraj Development Paradigm as the most pertinent framework to tackle growing inequality and the environmental crisis.

The book is structured in four parts: an explanation of the Swaraj Development Paradigm; an analysis of the *khadi* sector; ways in which the sector can be changed; and a snapshot of the practices he has undertaken at the Khadi Initiative he works with.

The paradigm is explained using three interconnected sections: morality, politics and economics, explained in the context of the *khadi* sector in Karnataka, which he studied for a year. The section on the *khadi* sector shows the malaise most Indian systems seem to be inflicted with – corruption, workers being exploited, identity-related favours, and an overwhelming sense of drudgery.

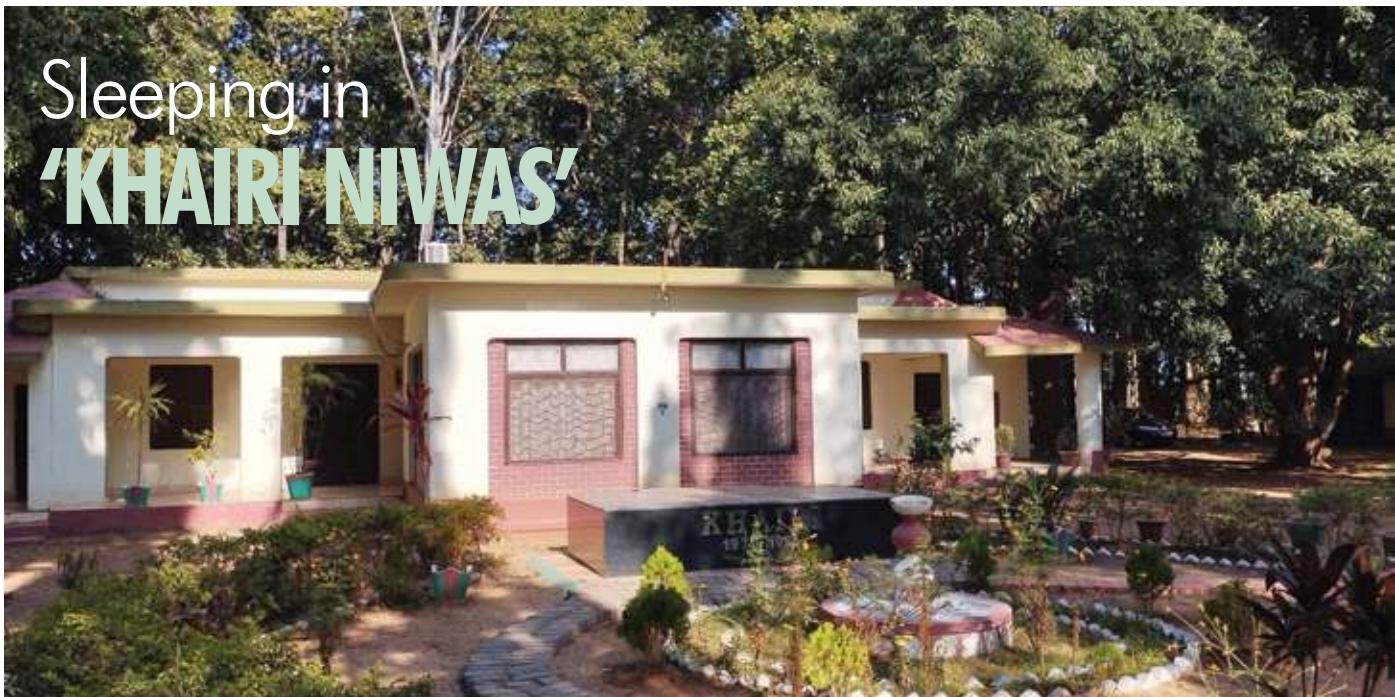
Where many would accept this as status quo, Sumanas is not bogged down by systemic inequalities and the dust surrounding the reams of *khadi*. His book leaps to action, calmly and transparently, and lays out his experiments at Janapada Seva Trust’s Khadi Initiative for the reader to try. He peppers his chapter on the way forward with organisations that are following aspects of the Swaraj Development Paradigm. This includes the Honeybee Network, Mazdoor Kisan Shakti Sangathan, Dastakar Andhra, and Chennai’s Organic Farmers’ Market, which one can explore for an application of the paradigm in different contexts.

The ideas Sumanas presents not only encourage the reader to not only consider the existing socio-economic order, but also spark self-reflection. For instance, he writes: “self-rule (*Swaraj*) is not only an act against the oppressive forces embedded in social and state practices but also entails an internal struggle”. He connects the ideas of development, environment and the interconnectedness of human life (or the web of life), throughout the book.

Just as the concept of development requires attention to nuances, Sumanas’s book will require careful reading and possibly some soul searching on its ideas. Given that it has evolved from an academic exercise, the book can be heavy reading. I advise patience and some homework – both of which will yield rewards because his march towards reform and reimagination and the practice of the Swaraj Development Paradigm is an important contribution to actionable change for equity and the environment.

**Reviewed by Shatakshi Gawade, Sanctuary Asia.**

# Sleeping in 'KHAIRI NIWAS'

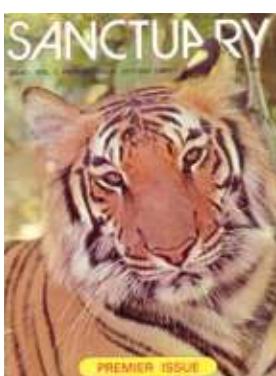


By Raza Kazmi

I have been traveling the forests of eastern Chhattisgarh and central Odisha for nearly 11 days now. I just arrived a few minutes before midnight at my final pitstop in this – 2,000 km. journey before I head back to Jharkhand tomorrow morning. It is a place that never fails to move me, but more so today since I would be sleeping tonight in a house that once was someone's home. This quaint house in the one-street town of Jashipur was home to an exceptional family. A remarkable couple once lived here with a 'daughter' like no other, and her many special 'siblings'.

The couple were Saroj Raj Choudhury, an IFS officer, and his partner Nihar Nalini Swain. Their 'daughter' was a tigress, named

Khairi, lovingly referred to as the 'Princess of Simlipal' by her legion of admirers. Her siblings – a naughty bear, a blind hyena, an adorable dog, a delicate *chausingha* (four-horned antelope), a lazy python, along with other rescued denizens of the forest. This quiet, desolate building was once their happy home, a now-silent witness to an incredible tale of love and affection, which unfortunately doesn't have a happy ending.



**ABOVE** This quaint house in the one-street town of Jashipur was IFS officer Saroj Raj Choudhury's home where he raised 'Khairi', the tigress, the cat on the cover of the very first issue of Sanctuary, photographed by Kailash Sankhala!

Khairi rests in her forever home just outside my room after her 'father' was forced to put her to sleep when she was aged seven, a trauma he would never recover from for he soon followed his beloved 'daughter' to the heavens. Nihar died in an old age home, alone, hundreds of miles away. Their home became a Forest Rest House named 'Khairi Niwas' (Khairi's home), and all that remains now are memories of that incredible tale strewn all across this home.

The room I sleep in tonight is the same where Khairi once slept with her 'parents', tucked in between them on her bed. The attached bathroom, as an old photo above the bathroom door reminds me, was once hers.

I can't help but be engulfed by an overwhelming sense of sadness and grief as I lie here on the bed after a long backbreaking drive. I wish that the entire family was still here, with the tall *sal* trees outside still watching over them as they went about with their charmed lives.

PS. While S.R. Choudhury was away at a conference, Khairi was bitten by a rabid dog that had sneaked into the campus. Khairi had killed the dog and nobody realised that the dog was rabid. After a few days when SRC returned, he noticed she was getting sick. Soon the standard rabies symptoms set in and SRC couldn't bear to see her go through that agony anymore. So, he had to put her down. He went into a deep depression after that and passed away a few months later. 

**Raza Kazmi** is a conservationist, writer and wildlife historian. His field of expertise includes the wildlife history of India, conservation policy, and conservation issues in the country's 'Red Corridor' landscape.



# NETWORKING

Join Sanctuary's **online network**

**The Sanctuary Nature Foundation's print, on-ground and online network has grown to over a million caring individuals in India and across the globe. We would be delighted if you were to invite your family and friends to join this purposeful group to celebrate and protect our planet and its utterly miraculous biosphere.**



@sanctuaryasiapage  
@sanctuaryasiagroup



@SanctuaryAsia  
@SanctuaryAsia



@ranjeetnature Thank you very much, @SanctuaryAsia and @BittuSahgal sir, for shining the spotlight on me during the Sanctuary Wildlife and Photography Awards 2022 ceremony.

@shaibaba Absolutely lovely to see @MunmuniPayeng as the @SanctuaryAsia Young Naturalist awardee. She carries forward her father @JadavPayeng and family's mission to rewild forests of #Assam. Like @BittuSahgal says – restoring the Earth is not one man or one generation's mission!



COURTESY MUNMUNI PAYENG

@RazaKazmi17 So well-deserved! Dr. Prakash's work first sounded the alarm on the catastrophic crash in vulture populations across India. Since then, he has assiduously worked towards saving and reviving these once-abundant-in-millions-now-critically-endangered, culturally-maligned birds.



*On the image 'Outrunning a Rampage'*

**Chew SY** This seems to happen often, as drivers approach elephants too closely. Safe practice is lacking and it is an accident waiting to happen.

*On 'Close Encounters of the Scale-y Kind'*

**Avishkar Mokashi** I was bitten by a Russell's viper in 2013 while trying to save it. With no assurance of survival, 21 vials of ASV and two surgeries later, I still love them.



*On 'In a Fell Swoop'*

**rohitarora0610** Congratulations! The picture must tell a story... looking at the picture... nothing was clear, except that this is a swarm of some insects! It's a number one choice for abstract nature photography but I am wondering how you have a winning picture that is so abstract, without telling a visible story of conservation?

*On 'Breaking Bad'*

**Angadachappaphotography**

I think this is one of my favourite photos from the set of images from the awards.

**The\_jungle\_guy** An animal that is marginally equivalent to humans in terms of learning.

*On 'Eyeing Death'*

**Kanchansingodia\_photography**

This picture is heartbreaking... the roads and railway lines crossing through or near national parks and wildlife sanctuaries are death sentences for our wildlife.

**Diggu\_92**

No one is more disturbed by these incidents than the people on the ground. We are passionate about these amazing creatures and love what we do, but still have to photograph it because a beautiful image is useless if it doesn't show the full truth.

**Sidharthojha**

People are happy to see images of cute and cuddly animals all day, but a single image of a brutal reality makes them want to shut their eyes and go back to their bubble.

**anshumansingh1915**

We are losing our micro habitats by the day with mindless construction. In Jabalpur, a beautiful piece of wilderness the Dumna Nature Reserve has 10 resident leopards, all within municipal limits and yet the political class wants the place for development projects such as Sports City, IT Park, hotels and more. We are fighting a tough battle to save it.

*On 'Mount Debris'*

**Sanjayd1512** This is the main problem. Wildlife does not get space because of our wrong urban planning and infrastructure. Wildlife conservation must be a part of urban planning as well as in architecture schools.



# READERS' FORUM

## On Sanctuary Wildlife Awards 2022

So grateful to the Sanctuary Nature Foundation for the endorsement of my humble efforts. This recognition is perhaps the first, and certainly the biggest, for climate action in India. It comes at a time where Indigenous people-led nature restoration has been acknowledged as the key to combating climate change. There cannot be a better motivation to scale up the fight for a better future.

*Rituraj Phukan, Assam*

The Awards were amazing and no words can effectively express the elegance of the event.

*Sharda Mandir High School, Mumbai*

Every single awardee and spotlighete was inspiring. We now feel even more motivated.

*Cathedral Middle School, Mumbai*

A truly enriching experience to be able to see the amazing work that is being done by the Sanctuary Nature Foundation and to be able to meet the incredible people contributing towards planet conservation at the grassroot level. Their passion, dedication and selflessness are truly inspiring.

*Dr. Deeba Khalid Peer, Deputy Director, Publicity, Department of Tourism, J&K*

SANCTUARY PHOTOLIBRARY



## IN OUR NEXT ISSUE...

### Trouble in Paradise

A massive, Rs. 72,000 crore infrastructure, township and tourism project has been granted forest and environment clearance in Great Nicobar Island, completely ignoring its rich biodiversity (a million trees could be cut!), its seismic volatility and vulnerability, and the rights and lives of the island's human inhabitants, particularly its indigenous communities. **Pankaj Sekhsaria** provides a detailed account of this callous and reckless journey of clearances that has brought a deeply fragile and unique island system to the brink in merely 24 months.

Thank you for being the light that has shone for over four decades now, on those faces in the crowd and for having us be a small part of this incredible story.

*Faraway Originals, Mumbai*

Appreciate the efforts of Sanctuary in honouring the Earth heroes from remote places in India. Their sincere services are the real buffers in mitigating the damage we urbanites cause. The overall ambiance, the wildlife photography exhibits, the prevailing like-minded thoughts created a positive aura leaving us feeling hopeful.

*Radhika A. D'Souza, Royal College, Mumbai*

Witnessing the awards is a euphoric experience. Simple people from the remotest parts who selflessly and passionately work towards preserving nature are brought to light. This reaffirms our faith in humanity, the ability of nature to heal, enhances the self-esteem of these nature warriors and they, in turn, are inspired and motivated to do more. This explains young **Munumuni Payang's** decision to follow in the footsteps of her father.

*Kamala Arunchalam, Dean, Royal College, Mumbai*

Bittu Sahgal's moving presentation on the havoc that climate change and our choices can cause was brilliant. The Sanctuary Awards 2022 were given to common people such as guards, guides, teachers – whose lives have made a difference to nature conservation.

*Ravi G, Zoology Professor, Royal College, Mumbai*

## On The Future of Wildlife Tourism

I have had the privilege of being a wildlife tourist and wildlife conservation project funder since 1985. The future of wildlife tourism, I believe, is bleak, as the growth over the last two decades has been mainly uncontrolled and unregulated. Infrastructure built to accommodate them and the huge influx of workers to provide for their needs has completely changed the character of these destinations! Yet, the wildlife habitats are no bigger and there is much less wildlife – totally unsustainable

PUBLIC DOMAIN/ARNE MÜSLELR



development. There have been also been radical changes in the tourists' attitudes towards wildlife viewing! Earlier, content to sit quietly with binoculars and observe, now the objective is to get great photos! The only solution is stricter regulations and a major reduction in tourist numbers, but then of course, there would be fewer grubby dollars to go around.

Peter Thomas,

Tourrettes sur Loup, France

### On 'Bringing the Cheetah Back to India'

These are African cheetahs and NOT Asiatic cheetahs. So, using the generic word cheetahs is misleading and half the truth. The entire argument falls flat when one knows that these are exotic species and have no ecological function.

Anand Pendharkar, Mumbai

#Africancheetahs were never in the Indian landscape, so how can one say to "bring back" something which was never here in the first place?

Sushant Bali, Mumbai



SHIVANG MEHTA PHOTOGRAPHY TEAM

**A Biodiversity Haven**

Explore Great Nicobar Island's unique biodiversity, from several endemic species of mammals, birds, reptiles to flowering plants, in this stunning photofeature – a reminder of the abundance we stand to lose.

SHASHANK DALVI

In my village there were 3,600 blackbuck 30 years ago, but now only a hundred are around. Over the last one year, 10 have

been lost out of a group of 48 that live in a small *oran* (sacred community-conserved areas in Rajasthan). This *oran* is fenced by farmers and there are over 50 feral dogs eager to eat them. Even a newborn baby is killed immediately by the dogs. But authorities will work towards their protection only once they reach the brink of extinction, like the GIB.

Sharvan Patel, Jodhpur

### On 'The Special, Spatial Lives of Amphibians'

Insane... the level of complexity in this universe is confounding.

Kunal Kaushik

### On 'Haiderpur: A Paradise Along The Mighty Ganga'

Haiderpur is immensely important to be saved for all the right reasons.

Ratul Ghosh

## Author's Speak

### Article: Plant Pirates

The plant world is filled with intrigue – there's lying, cheating, teaming up, and sometimes, there's absolute criminal genius. It's this last category into which I would place Cuscuta, or the parasitic dodder plant. It has no roots, and no chlorophyll, relying entirely on its host for nutrients. But the dodder is no ordinary parasite. In addition to a sophisticated sense of being able to locate and feed off of its hosts, it has the ability to "steal" genes from the host plant, using them to fight and evade host defences. This level of genetic and physiological precision, not attained by humans till the 1990s through recombinant DNA technology, has been a part of the dodder's evolutionary arsenal for millennia.

Soham Kacker, Delhi



SOHAM KACKER

### Article: Close Encounters of the Scale-y Kind

Enjoyed writing this piece and I definitely aim to write more in the future.

Trishala Ashok, Bengaluru



■ Trees cut   ■ Trees left

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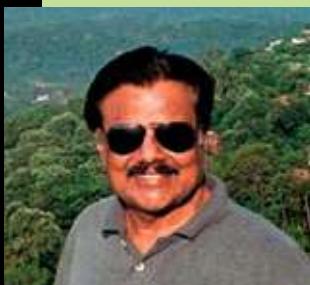
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# Sanctuary

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