A Common Ground

A look at Regenerative Agriculture, a practice that protects biodiversity and people and mitigates climate change

Turning the tide on abandoned ghost gear

Ray of Hope

An account of challenges and opportunities in the Sundarbans

Waves of Change

Turning the tide on abandoned ghost gear
In its mission for conserving the environment, WWF-India works with multiple stakeholders from various walks of life. Together, we strive to address the common goal of conserving biodiversity, sustainably using natural resources, and maintaining ecosystems and ecosystem services for the well-being of people and wildlife.

Nature Matters is a reflection of the work, people, and stories that keep us abuzz. Dive deep into our work in conservation from the length, breadth, and boundaries of India. Nature Matters is a quarterly publication available free of charge online and in print.
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A sambar (Rusa unicolor) at the Dudhwa Tiger Reserve, Uttar Pradesh
Image Courtesy: Ravneesh Singh Klair
FROM THE EDITOR’S DESK

Dear Readers,

We are pleased to bring you another Volume of Nature Matters, highlighting some key areas of work and sharing insights based on our experience on the ground.

In this issue, we focus on two promising initiatives that could help address significant conservation and livelihood challenges – regenerative agriculture and the upcycling of ghost gear. We are also excited to share the nascent formation of a movement for the conservation of vultures, the most misunderstood but critically important species!

We all know that grassroots movements are the most durable and sustainable, and such is the example of the women’s group that has turned Phademchen into the cleanest village in Sikkim. We also bring to you the continued work of WWF India alongside communities living with wildlife and coping with climate change. And finally, just to remind us of the magnificence of the wild, is a fantastic montage of a duel between a serpent eagle and a cobra!

We hope you enjoy this issue and we look forward to your feedback.

Dr. Sejal Worah

Programme Director
WWF-India
A Session on the Role of Productive Renewable Energy at the 28th Session of the Conference of the Parties (COP28)

WWF-India hosted a session “Tales of Hope: Clean Energy Transition in Rural India” on 6th December 2023 in Dubai, with support from HSBC Climate Solutions Partnership (CSP). The session focused on the role of Productive Renewable Energy (PRE) in rural energy transition in India, discussing key barriers and challenges for their scale-up, and looked forward to possible solutions emerging from CSP and other initiatives. Like India, several countries in the Global South, especially in Africa, have a significant opportunity to foster PRE solutions for their energy transitions. The session provided a platform for speakers and participants to share experiences and showcase best practices for Decentralised Renewable Energy (DRE) implementation in India and help other countries learn from India’s approach. Distinguished speakers from national ministries, government agencies, and senior social entrepreneurs discussed solutions to overcome the barriers and challenges to scaling up the distribution of renewable energy, particularly PRE.

Ganga Samman for WWF-India staff member

Neera Chaudhary, Senior Project Officer, Stakeholder Engagement, Rivers and Wetlands, was awarded the prestigious Ganga Samman for her contribution to the river and its biodiversity. WWF-India has established a strong citizen volunteer network of “Ganga Mitras” (friends of the Ganga) in 50 riparian villages along a 225 km stretch of the river in Uttar Pradesh, including the State Animal Barasingha Sanctuary, Hastinapur, and the Upper Ganga Ramsar Site. Ms. Chaudhary was responsible for volunteer training and ensuring active participation in conservation initiatives by the District Administration and Forest Department. She was recommended for the award by the State Mission for Clean Ganga, Uttar Pradesh.

Nilgiri tahr at the Anamalai Tiger Reserve, Tamil Nadu
Image Courtesy N. Navaneethan/ WWF-India

Ganga Samman for WWF-India staff member

Neera Chaudhary was awarded the prestigious Ganga Samman
Image Courtesy: WWF-India
Partnership for Nilgiri Tahr Conservation

WWF-India has started contributing to Project Nilgiri Tahr through a technical collaboration with the Tamil Nadu Forest Department (TNFD). The project hopes to shed light on the Nilgiri tahr (Nilgiritragus hylocrius) population, as well as their distribution and ecology. The collaboration will include activities such as telemetry studies through collaring, disease investigations of the tahr population, refining methods for a synchronized population estimation across Tamil Nadu and Kerala, and restoration of Shola grasslands to reintroduce the Nilgiri tahr to a few of its historical ranges. The TNFD has pledged Rs 25 crore to the project.

RIIAM: A Tool for Comprehensive Infrastructure Impact Analysis

The Tech for Conservation team at WWF-India has developed a tool that helps understand how proposed infrastructure affects the quality of any connected ecosystem or conservation landscape. The model application named Rapid Infrastructure Impact Analysis Model (RIIAM) facilitates a strategic approach for proposed infrastructure by assessing the effects on connected ecosystems through spatial analysis and pre-planning. Decision-makers can use RIIAM to meet sustainable development goals while enabling infrastructure projects by prioritizing valuable landscapes, thus aiding conservation efforts.

Media Workshop on Reporting Human-Wildlife Interaction

Media reporting is vital in generating a first yet impactful public perception of wildlife during human-wildlife interactions. This can help manage and mitigate cases where conflicts may arise, especially for communities and stakeholders who live near wildlife habitats. WWF-India conducted an orientation programme for vernacular media houses in Bettiah, Bihar—a town near the Valmiki Tiger Reserve (VTR). The session apprised them about the numerous interactions and conflicts, the on-ground challenges that may arise for different stakeholders, and how neutral reporting can help shape discussion on human-wildlife conflict.
A Common Ground: Regenerative Agriculture for People and Nature

Regenerative Agriculture (ReAg) is a promising practice that has garnered attention for the judicious use of natural resources and sustainable methods. Sumit Roy decodes the organization’s efforts working with farming communities on ReAg to protect biodiversity and mitigate climate change by adopting a holistic view of the land.

Agriculture, akin to other production systems, functions as a business where profit margins cannot be overlooked. Unfortunately, producers, particularly smallholders, are frequently constrained by narrow profit margins, a consequence of poor commodity price realization and escalating input costs. The pursuit of swift returns and an emphasis on over-production foster unsustainable practices like extensive use of chemicals, a shift towards mono-cropping, and heavy farm mechanization. Such practices lead to the degeneration of natural ecosystems, harming soil health and surrounding biodiversity.

According to a 2017 Food and Agriculture Organization estimate, 75 billion tonnes of soil is eroded annually from arable land worldwide, resulting in USD 400 billion in loss per year. Chatham House, a premier global policy institute, has pinpointed agriculture as a
global policy institute, has pinpointed agriculture as a critical contributor to biodiversity loss, underscoring the adverse impact of agricultural intensification on the quality and quantity of available habitat. The 2022 Living Planet Index, a report by WWF, revealed a 69% decline in the populations of mammals, birds, amphibians, reptiles, and fish worldwide over the past half-century. Agriculture contributes to a significant part of this decline (fig1). Given the alarming consequences, there is a need for a reformed and resilient approach to agriculture production systems. Such an approach must invoke nature-based solutions that regenerate soil, foster an increase in biodiversity, keep waterbodies clean, support livelihoods, and bolster climate action.

**Figure 1. Table on conventional agriculture and its impacts on soil**

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<tr>
<th>PHYSICAL</th>
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<th>BIOLOGICAL</th>
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<tr>
<td>Action</td>
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<tr>
<td>Excessive tillage operation</td>
<td>Excessive irrigation</td>
<td>Monoculture</td>
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<tr>
<td>Use of heavy machinery</td>
<td>Heavy use of agrochemicals</td>
<td>Inadequate application of organic matter</td>
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**Impact**

- Compaction
- Erosion
- Salination
- Contamination
- Nutrient imbalance
- Loss of soil biodiversity
- Reduced soil organic matter

Harvest of crop residue following intercropping at a field in Chhindwara, Madhya Pradesh
Image Courtesy: Dr. Kaushik Ghosh
Rethinking Agriculture for a Thriving Planet

Regenerative Agriculture (ReAg) is a promising nature-based approach in farming that has captured significant interest. Its rising prominence stems from a comprehensive outlook that addresses prevailing challenges in modern agriculture. Despite its growing appeal, ReAg defies a rigid definition. It is not a one-size-fits-all solution; rather, its principles are tailored to suit the unique nuances of local environments with a focus on rejuvenating and restoring soil health (fig 2). It embraces the multifaceted characteristics of the local ecosystem and advocates for the prudent utilization of natural resources to grow food safely and sustainably. This approach promotes novel yet scientifically grounded farming practices.

ReAg has various synonyms and is embodied in closely related concepts of sustainable agriculture, including agroecological farming, biodynamic farming, nature-positive farming, conservation agriculture, and organic agriculture. At its core, ReAg represents a holistic approach to farming oriented towards both processes (such as crop diversification and the application of cover crops) and outcomes (improved soil health, biodiversity, etc).

Figure 2. Principles of Regenerative Agriculture

Non-mechanised tilling at Chhindwara, Madhya Pradesh Image Courtesy: Dr. Kaushik Ghosh
WWF-India’s RegenScape: A case study from the Central India Landscape

While discussions for transformative food production systems are ongoing at a global level, WWF-India considers ReAg as a means of confronting the ‘Triple Challenge’: rejuvenating nature, combating climate change, and ensuring cost-effective food and fibre production. WWF-India’s initiatives in ReAg — particularly in the Satpura-Pench wildlife corridor of Central India — centred around biodiversity conservation is charting a course toward transformative landscape-level changes.

The Central India Landscape sprawls across 19 districts in three states of India, covering a total area of 1,57,241 km². The landscape holds 20% of the global population of tigers and contains some of the country’s most famous Tiger Reserves. The landscape is a tapestry of Protected Areas and agricultural fields, connected by wildlife corridors that feature a variety of land uses. Within this ecological confluence, WWF-India champions the cause of ReAg for key crops such as cotton, pulses, and oranges, especially within the Satpura-Pench Corridor, nestled in the northwestern quadrant of the Central India landscape (fig 3).

WWF-India works with 6,000 smallholder farmers to facilitate their transition towards regenerative farming methods. The practices include the introduction of red gram and other legumes as intercrops with the main cotton crop. The sowing of green manure crops between two rows of cotton and their incorporation in the soil is done after 30-45 days of sowing. Border and trap crops are also introduced to reduce pest incidences and to foster an increase in the population of beneficial insects and pollinators.
The ReAg within the corridor aims to enhance the profitability and sustainability of farming for local communities. The market serves a crucial role in offering economic incentives for produce. It reduces input costs, promotes collective buying and selling, and adds value to specific crops. It, thus, establishes a secure economic foundation and reinforces the commitment to ReAg practices. In the best-case scenario, cotton farmers practicing regenerative organic farming have shown a 43% increase in net return compared with conventional cotton farmers in the region. The increase in net return is attributed to several factors inherent to regenerative organic farming practices. These practices reduce input costs by relying on natural processes and materials for pest management and fertilization and providing additional income streams from other crops grown in the systems.

ReAg, with its improved plant diversity, soil health, and pollinator population, secures the ecological integrity of the wildlife corridor. The farm-forest mosaic nature of the Satpura-Pench Corridor not only supports productive farming but also provides wildlife with viable corridors between Protected Areas.

The transformative shift towards regenerative practices within the corridor is a result of concerted efforts from diverse stakeholders. This includes contributions from donors such as international brands and retailers, corporate foundations, and environmental organizations, alongside global and local markets spanning textiles to food and beverage companies. Additionally, research and agricultural extension institutions, including leading cotton research institutes and centres focused on organic and natural farming, play a critical role. At the grassroots level, civil society organizations like SRIJAN, farmer-led enterprises such as the Chhindwara Organic Farmers’ Enterprise (COFE), and multi-stakeholder initiatives like the Regenerative Production Landscape Collaborative all contribute to the ecosystem of support that makes regenerative transformation possible.

WWF-India is actively supporting farmers in refining production methods tailored to the specific context of their farms. Such methods foster an ecosystem that supports biodiversity, improves soil health, enhances water quality and retention, and enhances livelihoods.

**Transforming the Agriculture Business**

ReAg is gaining significant traction globally, finding favour amongst major players in the food and agro-based businesses (FAB). It has become a point of discussion regarding the transformation of food-systems within the United Nations Framework on Climate Change. Notably, at the recent United Nations Climate Change Conference (COP 28) in Dubai, more than 25 influential FAB entities united forces to propel ReAg collectively. The shared goal is to fortify
Cotton farmers practicing regenerative organic farming have shown a 43% increase in net return compared with conventional cotton farmers in the region.

ReAg marks a groundbreaking sustainability initiative poised to bring about a transformative shift in the food production landscape. This promises a mutually beneficial scenario for all stakeholders: from farmers at the grassroots to end consumers. Given the conjunction of motivation and favourable market conditions, now is the opportune moment to modernize the food production system, heralding a new era of prosperity for the people and the planet.

Sumit Roy is the Head of Production Landscapes.
The upcycling project began with exploring the potential reuse of fish nets as crafting material. Following a meticulous process of cleaning, washing, and sun-drying, the nets transformed into a ready-to-use material, free of residual smell or dirt.
Abandoned fishing gear, lost or discarded at sea continues to ensnare species and suffocate underwater habitats. This derelict gear, dubbed “ghost gear”, comprises roughly 10% of all the plastic debris currently adrift in our oceans. Vinod Malayilethu and Shirin Kaur explain how communities on both coasts of India are now trying to turn the tide on ghost gear by upcycling it.

In India’s marine ecosystems, a silent and often invisible menace lurks beneath the waves: Abandoned, Lost, or Discarded Fishing Gear (ALDFG). Ensnaring species and suffocating underwater habitats, this so-called ghost gear comprises roughly 10% of all the plastic debris currently adrift in our oceans, a 2016 study estimates. Nets made from nylon and High-Density Polyethylene (HDPE) – including gillnets, trawl nets, seines, and lines – are especially harmful, given their ability to fish indiscriminately for years. No wonder then that ghost gear is considered the most deadly form of marine plastic debris, damaging vital ocean habitats, aquatic life, and livelihoods. Studies have estimated that up to 267 marine species have been affected by plastic pollution worldwide.

Since 2019, WWF-India has been working to address the ghost gear problem in the country’s territorial waters. Surveys have been conducted in Tamil Nadu, Andhra Pradesh, Kerala, and Goa to understand its pervasiveness. The surveys revealed that fishers lose their gear while fishing or nets get entangled in underwater structures. Free-floating gear is also found in near-shore waters, as no one is incentivized to remove it.

To effect positive environmental and social change, WWF-India is addressing the ghost gear problem locally and creatively by joining hands with local fisher communities to upcycle ghost nets and create products using skill-intensive handcraft techniques. This alternative livelihood incentivizes fishers to actively retrieve ghost gear encountered at sea. Waves to Weaves is a story of reclaiming discarded fishing gear and transforming them into useful products; it not only carries the essence of the sea and its habitat but also promises a sustainable future. These woven products represent a first-of-its-kind initiative where the community members work directly with the material instead of working with plastic pellets made by recycling the ghost gear.

The upcycling project began with exploring the potential reuse of fish nets as crafting material. The initial experiment focused on trawl and multi and mono-filament gill nets. Following a meticulous process of cleaning, washing, and sun-drying, the nets transformed into a ready-to-use material, free of residual smell or dirt.
The initial technique explored was crochet, but the knots in the net proved impossible to unravel. Crocheting, a skill demanding practice and patience, became particularly challenging with ghost nets. The method also imposed limitations on the range of products that could be created. Subsequently, macramé was experimented with. While this technique was relatively easy to learn and produced minimal wastage, a machine was needed to twine the nets – which was a serious challenge. Hand twining proved inadequate for producing high quality products and imposed constraints on the length of the rope required.

The technique that emerged as the most suitable local solution was weaving, using handlooms, which stood out for the following reasons:

**Simplicity**
Handloom weaving was easy to learn and helped in dealing with irregularities in texture and knots, in contrast to conventional yarn like wool or cotton.

**Versatility**
Weaving opened up a wide range of product possibilities. From simple, standard items like wall hangings and coasters to more intricate, customized pieces like bags and purses.

**Visual Appeal**
Weaving with fishing nets was found to be visually appealing, and it also created a clean and interesting texture that enhanced aesthetic appeal by showcasing the unique qualities of the material.
The skill development workshops, which spanned 15 days, featured a carefully curated curriculum tailored for an audience with no prior experience in design or weaving techniques. The program introduced participants to the basic elements and principles of design to inspire independent thinking and equip them with innovation skills. Participants were introduced to elements such as Dot, Line, Shape, Form, Texture, Colour, Space, and Value, along with Balance, Contrast, Emphasis, Pattern, Unity, Movement, Rhythm, and other principles. This intensive skill training phase also encompassed various practical techniques, including cutting, rolling yarn, setting up a loom, basic weaving, interlocking, creating shapes, colour blocking, making fringes, and concluding with panel removal and edge finishing. Upon building familiarity with weaving techniques, the focus shifted towards the product development phase, during which participants initially worked on simpler products such as bookmarks and coasters. This phase facilitated the transition from theory to practice while encouraging participants to apply what they had learned in design and conceptualize product ideas.

More than 75 people from fishing communities in Lakshadweep and Tamil Nadu were trained in the art of weaving the ghost gear. WWF-India has planned future workshops in Kerala and Maharashtra and additional sessions in Tamil Nadu to scale up and establish an enterprise for producing and selling these novel handicrafts. Under the brand name Waves to Weaves, WWF-India aims to facilitate the sale of upcycled products and save our oceans one weave at a time.

“I was unfamiliar with the method of weaving using waste nets, but I find it impressive that these nets can be turned into useful items. Usually, this material is thrown away as waste but now I see the value in repurposing them.”

– Christina, Rameshwaram, Tamil Nadu

Vinod Malayilethu is the Associate Director of Marine Conservation. Shirin Kaur is a Design Consultant with WWF-India.
A Committee for Vultures

The Annual Vulture Count is a growing initiative that brings birders, wildlife enthusiasts, and photographers together to monitor vultures. Rinkita Gurav narrates how citizen participation and engagement in observing vulture populations contributes to scientific research and conservation.

The Inception of a Movement

Once relegated to the peripheries of wildlife narratives, vultures are mighty scavengers that have rightfully risen to the forefront of a conservation movement propelled by a collaboration of birders, wildlife enthusiasts, and the unwavering efforts of conservationists. Since 2021, hundreds of birders from across India have joined the Annual Vulture Count, providing scientists with important data for vulture conservation in India. Every chapter of the Annual Vulture Count also hopes to inspire affirmative action toward conserving vultures.

The concept of a citizen science-based conservation programme for vultures was conceived following the decline in their populations over the past decade. Conservationists arrived at a three-pronged approach for the programme: monitor, understand, and recommend safeguards to conserve the habitats of India’s vultures.
Egyptian vultures (Neophron percnopterus)

Image Courtesy: Aishwarya Laghate/ WWF-India
For the Annual Vulture Count, WWF-India partnered with Bird Count India, an alliance that epitomizes the collaborative spirit of conservation. Two intensive sessions equipped 180 volunteers from 17 states with the tools needed to identify, record, and upload vulture sightings on eBird.

The Need for a Movement

Awareness of vulture mortality initially surfaced during bird surveys conducted in Bharatpur, Rajasthan, in the 1990s. The widespread use of veterinary non-steroidal anti-inflammatory drugs (NSAID) administered to livestock has been a critical factor behind the diminishing vulture populations in India. As vultures feed on carcasses containing drugs like diclofenac, ketoprofen, acceclofenac, nimesulide, and flunixin, it triggers fatal consequences, leading to a significant decline in their overall population. The threat isn’t confined to NSAIDs alone; numerous other issues like retaliatory poisoning due to human-stray dog conflict in Assam have killed hundreds of vultures in the last few years. Other than poisoning, remnant vulture populations are also threatened by high-tension transmission lines near the feeding areas and the availability of safe food. These threats endanger the remaining vulture populations and emphasize the urgent need for sustained monitoring and conservation efforts.

Annual Vulture Count 2023

Since its inception, the collaboration has produced important data on vulture populations. For the Annual Vulture Count 2023, WWF-India collaborated with Bird Count India and eBird, and brought together 180 volunteers from 17 states. The volunteers comprised field experts, and community members. Over two intensive sessions, they were taught how to identify and upload vulture sightings and record behavioural data on eBird by Mittal Gala from Bird Count India. Armed with binoculars, cameras, and smartphones, participants became the eyes and ears of vulture conservation.

1,305 individual vultures were recorded across 12 states in 2023 — in 2021, that number was 362 across 10 states. This is a positive step forward to understand vulture population dynamics. Seven out of the nine vulture species in India were recorded in 2023. Volunteers sighted threatened vultures like the Indian vulture (Gyps indicus), white-rumped vulture (Gyps bengalensis), red-headed vulture (Sarcogyps calvus) and the slender-billed vulture (Gyps tenuirostris), the endangered Egyptian vulture (Neophron percnopterus), and the near-threatened Himalayan griffon (Gyps himalayensis). Notably, the Egyptian vulture was sighted the most during the count in 2023.

The Annual Vulture Count has successfully educated and engaged the public in environmental issues, and is a powerful tool for data collection and long-term monitoring of vulnerable species. It draws inspiration from The State of India Birds (SoIB) Report, a leading, volunteer-based initiative that offers a comprehensive view of the status of several bird species.

Systematic recording and analysis of data provided by individual bird counts help researchers monitor population trends, evaluate the repercussions of environmental shifts, and pinpoint regions requiring conservation focus. Monitoring programs built on data from such bird counts can significantly contribute to a deeper comprehension of the ecological health of an area and highlight the intricate interdependence between avian populations and the ecosystems they inhabit.

Hope Soars

The Annual Vulture Count invites individuals to contribute to conserving India’s rich natural heritage. It hopes to demystify the world of conservation and enable each volunteer to become a steward of change. It also aims to bolster citizen science — a practice that can lead to a more harmonious coexistence with the natural world.

Rinkita Gurav is the Manager of Raptor Conservation.
Long-billed vulture (Gyps indicus)

Image Courtesy: Aishwarya Laghate/WWF-India
Manguraha: Sharing Spaces with the Wild

A small village in north Bihar near the Valmiki Tiger Reserve is learning to live in harmony with nature using traditional ways and means. Manguraha, like other villages in the Terai Arc landscape, is innovatively dealing with human-wildlife conflict with predator-proof corrals and watchtowers. Somreet Bhattacharya narrates how these measures are also helping the community focus on alternative sources of income.

Bordering the dense Terai Bhabar forest in northern Bihar are a handful of tiny villages. One of them is Manguraha, located on the outskirts of the Valmiki Tiger Reserve and flanked by sugarcane plantations.

The residents of this village, most of whom hail from the Tharu community and have settled here for hundreds of years, have adapted to sharing spaces with the wild. The red laterite soil and the Pandai river, now a feeble stream, bring livelihood and are also a source of spirituality as the folklore around it dates back to the Mahabharata.

The name “Tharu” originated from the Hindi word “Thaharav,” which means halted because of their claims of coming from a region of the Thar desert and settling in the outskirts of the Terai forests. “Thar” also refers to “native of the forest” in the local dialect.

A road meanders through Manguraha into the forest, a few hundred meters away – a stretch that is often used by tigers, leopards, sloth bears, and other wildlife. For the residents, the presence of wildlife draws tourists and creates livelihood. Apart from occasional fishing, some community members also forage the dry river bed for gold that they say flows down along with the rocks.

Village elders recall frequent encounters with tigers and sloth bears. 78-year-old Mohan Guro recalls his entire herd of goats being killed by a tiger a decade ago. Too scared to intervene, he could only watch as the tiger pounced on them.

“Tigers keep coming to the forest near my house, and if we give them a chance to feed on something, they will trouble us. Else, we can co-exist,” he says with a knowing smile.

The 50-odd families in the village have devised innovative ways to co-exist with the wildlife with support from WWF-India’s Integrated Tiger Habitat Conservation Programme (ITHCP) project, funded by KfW Development Bank. Guro has helped design a predator-proof corral where he now keeps his goats and chickens. The pedestal-mounted corral, a simple fenced structure surrounded with a wire mesh, serves as a pen for the cattle and helps Guro keep count of them.

The Bihar government has selected Manguraha to develop eco-tourism. Village youth are now becoming nature guides, hosting visitors and introducing them to Tharu culture and aesthetics. One of them, Subham, has started a birdwatching camp to train others. He hopes that these efforts will eventually turn the outer reaches of the forest, home to several trans-Himalayan species throughout the year, into a birdwatcher’s paradise.

A large tract of their village land is used for harvesting the sugar cane that sustains most households for the year. Manguraha, like other villages in the Terai Arc in Bihar and Uttar Pradesh, also faces issues of conflict with wildlife during the harvest season; the sugar lures wild herbivores, which attract tigers and leopards. More often, tigers take refuge in the tall sugarcane fields, presuming them to be grasslands, and come in conflict with local people harvesting their crops.
WWF-India has been helping the community and the Forest Department erect low-height watchtowers along the farmlands to keep an eye on wildlife during the harvest season. 36-year-old Sabita Devi, who lives near a spot where a tiger had attacked a farmer couple, says that village leaders have also created buffer patches between the agricultural land and the forest to monitor the wild animals from a distance.

Sensitized to the danger, children from the village school have also helped spread awareness about it within their families. “We also learn about their behaviour through school programmes led by trainers from WWF-India and the Bihar Forest Department,” says Sabita Devi, whose six-year-old son studies at the school.

They have also erected solar lights under the ITHCP Project so that the residents in the fringe area can spot wild animals at night. As dusk falls, the LED lights turn on while Sabita and Mohan Guro return to their huts. “We avoid stepping far out in the evening. After all, wild animals, too, need their space,” he smiles – his eyes bright, his wrinkled cheeks aglow.

Somreet Bhattacharya is the Manager of Programme Communication.
The Champions of Clean Himalayas

Swachhata Sahayogi, a women-led group, has turned Phadamchen into the cleanest village in Sikkim. Dawa Chhoden Bhutia and Lamu Doma Bhutia, two of the leaders of the group and former panchayat heads, narrate their journey to Somreet Bhattacharya. The women also discuss their vision for the future as they revolutionize waste management around the eco-sensitive zones in the eastern Himalayas.

How have you helped turn Phadamchen into the cleanest village in Sikkim?

Dawa Chhoden Bhutia: Our journey started in 2017 when WWF-India sensitised us about how waste was a major threat to the wildlife around us. Phadamchen lies on the edge of the Pangolakha Wildlife Sanctuary; the amount of food and material waste dumped by locals and tourists concerned us. Thus, we formed a group to help collect, sort, and store this waste in Material Recovery Facilities (MRF) for reuse. It was an uphill task due to the lack of awareness among locals and tourists. But six years later, we look back on our efforts with some satisfaction as we have managed to turn it around.

Our process is highly effective. Every household collects its waste and delivers it to the MRF, which we created with support from the State Bank of India Foundation through WWF-India. The households wash the plastic waste, segregate it, and hand it over to us so that we can process it further. We also have a compost pit now.

The Panchayat has been supportive in spreading awareness about it. Taxi drivers and homestay owners have been sensitized about collecting their waste and handing it over to the team instead of dumping it on the road. These efforts have spilled over to nearby villages, which are now undertaking waste management voluntarily.

Illustration Courtesy: Raivo Singh/WWF-India
How did your families react when you started the campaign and then turned it into a movement?

**Lamu Doma Bhutia:** No one took us seriously in the beginning. Our family members would not even mention our work to relatives and friends until the results showed. I was upset when I learned that my son had bought a pack of potato chips from a nearby village. I thought he had dumped the wrapper somewhere on the way to Phadamchen. But when he pulled the wrapper from his bag, it was washed and neatly folded. I had tears in my eyes. This is the impact we were hoping for.

Do you think there has been a change in the biodiversity around your village since you started the waste management initiative?

**Lamu Doma Bhutia:** Oh yes, there are more birds around us. Tourists now come to our village for birdwatching. The threats from feral dogs who used to feed on the waste have reduced, and the overall environment around the village has improved. Every other house in the village is opting to become a homestay because of the high tourist footfall. The best part is that tourists are taking back our positive energy and spreading the message of cleanliness, which aligns with the Swachh Bharat initiative.

How do you look at your project 10 years from now?

**Dawa Chhoden Bhutia:** We will be travelling to Shillong soon to interact with residents of Mawlynnong, Asia’s cleanest village. We will also host upcycling training sessions led by Bhutanese specialists to create products like dustbins, baskets, etc., from the Multi-Layered Plastics (MLPs) collected in the MRF unit. These will be sold to hotels and homestays within Phadamchen, adding a source of income for the Swachhata Sahayogis. Personally, I hope to see more villages in Sikkim and across India taking up waste management seriously, irrespective of proximity to wildlife habitats.

What message do you have for others living in Himalayan villages?

**Dawa Chhoden Bhutia:** We need to keep the Himalayas clean for our survival. Keeping the area free from waste protects rivers, forests, and other ecosystems and enables biodiversity to thrive. The Himalayas are our prized assets and heritage; it is our duty to protect them.

Somreet Bhattacharya is the Manager of Programme Communication.
IN FOCUS

Asian water monitor lizard (Varanus salvator)
Image Courtesy: Neha Sinha/ WWF-India

Lesser adjutant (Leptoptilos javanicus)
Image Courtesy: Neha Sinha/ WWF-India

Sundarban Mangroves, West Bengal
Image Courtesy: Neha Sinha/ WWF-India

Wild boar with offspring (Sus scrofa)
Image Courtesy: Neha Sinha/ WWF-India

Red fiddler crab (Mimusca minax)
Image Courtesy: Debmalya Roy Chowdhury/ WWF-India

Yellow bittern (Ixobrychus sinensis)
Image Courtesy: Neha Sinha/ WWF-India

Asian water monitor lizard (Varanus salvator)
Image Courtesy: Neha Sinha/ WWF-India

Lesser adjutant (Leptoptilos javanicus)
Image Courtesy: Neha Sinha/ WWF-India
Ray of Hope – A Narrative from the Sundarbans

Communities in the Sunderbans delta have been living on the brink, quite literally. Every year, they deal with powerful cyclones, rise in water levels, and cases of conflict with wildlife. The travelogue by Neha Sinha narrates the beauty and the challenges of the Sundarbans in the face of climate change.

The air crackled with the hint of danger – cyclone Mocha seemed to be on its way as we set off in a boat in the Sundarbans. Under an overcast May sky, the ash-colored water lapped erratically against our boat. We were surrounded by the famed mangrove forests of the Sundarbans, a deep bottle-green interspersed with red and brown leaves. The mangroves were like a pair of super-efficient lungs, puffing out wet, sultry air.

Deep inside the Sundarbans Tiger Reserve, we could hear a flurry of wildlife activity. A Black-capped kingfisher sounded like a metronome, cutting through the forest air. Jungle mynas cackled. And even in the oppressive heat, an Oriental magpie robin sang its beautiful song.

On close inspection, the silt-laden soil of the Sundarbans — speared through with knife-like mangrove tree roots — was full of wildlife. Red fiddler crabs, holding up their big pincer claw, skittered like clockwork over the soil. Large mudskippers, some several inches long, gleamed with an iridescent shine. A Mangrove heron moved on the shore, along with our boat. A lone lesser adjutant stork stood as a sentinel amongst young mangrove trees, looking like the solemn soldier it is named after.

The trees themselves were something to behold. There was the “walking mangrove” tree, the Garjan, (*Rhizophora apiculata*) whose roots emerged in elegant arcs from the main tree. They created a formation that resembled a cage. The roots add gravitas to the tree, which I decided to call the Sundarbans’ Banyan. Just like the banyan tree, it has a presence that seems kind and grand at the same time. I imagined an animal lying near the roots, snatching relief from the severe sun and looking for animal movement near the roots. As we scoped the bank, the boat’s captain shouted for us to come to the prow. On the other bank, looking slick and entirely at home, was the Asian water monitor lizard. The reptile moved with amazing fluidity for its large size (over three feet long). Its skin was covered in an absorbing pattern – spots of yellow flecked the grey skin, and the back had rosette-like markings in white. The monitor flicked its forked tongue at us, seeming to assess us and our intentions. It looked like the soil itself had come to life on that grey, muddy bank, perfectly camouflaged.

As we landed in Jamespur village near Satjelia island, I asked the villagers about storm surges. Mocha hadn’t hit, but what would the village do if it did? Men and women explained that they always lived in apprehension about the changing climate. They divided their lives into distinct periods of “Pre-cyclone”...
and “Post-cyclone”— an economic burden and also a psychological one. Increasingly aggressive storm surges were also becoming a huge issue – the storms, when they came, could bring lashes of salty water into sweet water fish ponds and damage embankments and property.

The solution for both wildlife and people then was to build climate resilience. In a hazard-prone area like the Sundarbans, resilience assumes more importance than any other climate action. One resilience strategy is to conserve naturally occurring mangroves, which keep shores mostly intact with their tough, net-like roots while absorbing the worst storm hits. With their capacity to store carbon in the soil and act as storm buffers, mangrove forests have been recognized as mitigation and adaptation measures. In the sixth Assessment Report of the Intergovernmental Platform on Climate Change released in 2023, the ‘reduction of conversion of natural ecosystems’ [such as mangrove forests] has been assessed as an important mitigation tool. The Sundarbans have several species of mangroves – many were laden with large and small fruit in May. But the tree that gives the area its name—the Sundari, (*Heritiera fomes*) is endangered today.

The Garjan tree has a global footprint, but as per the IUCN Red List, that is decreasing too. This makes it essential to protect the remaining forests.

Other resilience strategies include helping create decarbonized community services such as electric ferries, the gradual establishment of solar-powered water purification, and water and energy autonomy through solar-powered systems.

We hope these interventions will help create resilience, even as the Sundarbans continue to surprise us. As we moved through the delta, there was never a dull moment.

It was stiflingly hot and humid, but when relief seemed impossible, a merry breeze would spring up. In the early mornings, as the sun limned the water with gold, we saw things we didn’t expect. An entire group of rhesus macaque sat calmly on a large mangrove tree, one monkey on every large branch. A shore of dhani grasses waved like flags in the wind. A cheetal deer serenely munched on mangrove leaves, unconcerned by our presence. A family of wild pigs, the young one’s mottled body shimmered like a mirage. A cheetal stag grandly tossed his huge, antlered head. Also, part of the feeling of surprise was the daily transformation of the area. The land was shaped by water. When the water retreated in low tide, much more of the forest became visible. A salty-white line showed on the trees and shore, marking the levels of the last high tide.

Then there are the places where the water has never retreated from. We saw a church, its front portion, and stilts standing in water. The water had driven worshippers out. We saw other buildings, much closer to the shore than they should be. At first glance, it was like seeing a walking house from a fairytale. But of course, the buildings weren’t dipping their toes in the water; it was the water ingressing inwards. That month, Mocha did not come, but one never knows when other cyclones will. I thought about shorelines protected by Garjans and their seedlings, fighting a silent battle many in the mainland never get to know about.

The Sundarbans have an austere, heart-wrenching beauty, but it also spurs a rare passion. One hopes that despite the storms and rising sea levels, the forests will stand firm and its people will remain resilient.

*Neha Sinha is the Head of Policy and Communication.*
Cheetal (Axis axis)

Image Courtesy: Debnath Roy Chowdhury/WWF-India
Triumph of Tenacity

N. Ravikumar captured a standoff between two top predators — a crested serpent eagle (Spilornis cheela) and an Indian cobra (Naja naja) near the Amravati Dam in Tamil Nadu. After a few intense minutes of mock strikes, the eagle prevailed. It is rare for the cobra to be preyed upon; much rarer for such events captured, moment-by-moment!

N. Ravikumar is an Assistant Coordinator at the Western Ghats Landscape.