PANCHTATVA PARIVESH

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VOLUME 2 (ISSUE IV)

OCTOBER-DECEMBER 2024

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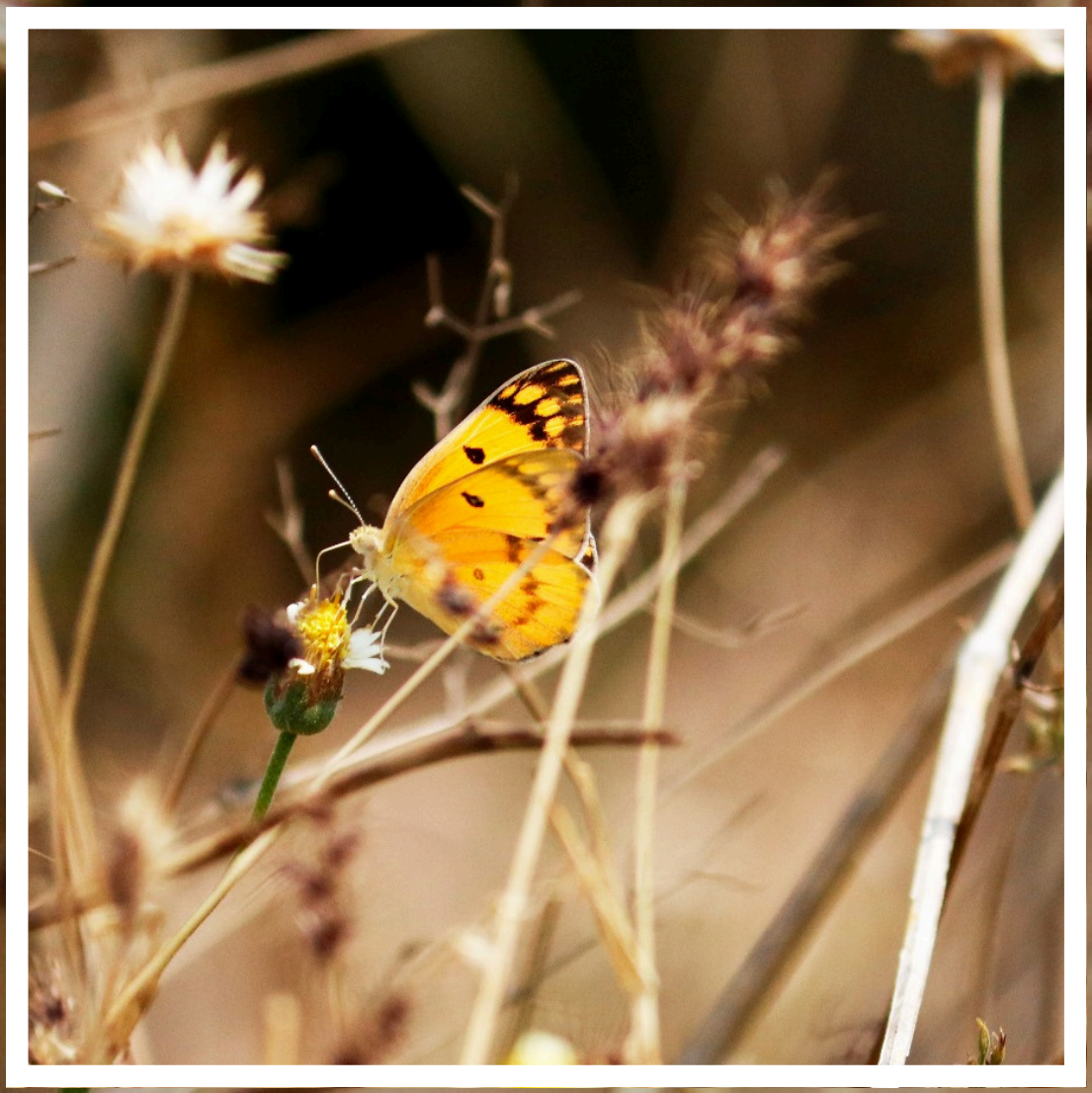
SRISHTI- THE ENVIRONMENT SOCIETY

P.G.D.A.V. COLLEGE (EVE.)

(UNIVERSITY OF DELHI)

About the Cover Page



Pic credit: Aaditya Nayak
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A newborn Colotis fausta, also known as the Large Salmon Arab butterfly, can be seen collecting nectar in the forested area of Southern Ridge, New Delhi.

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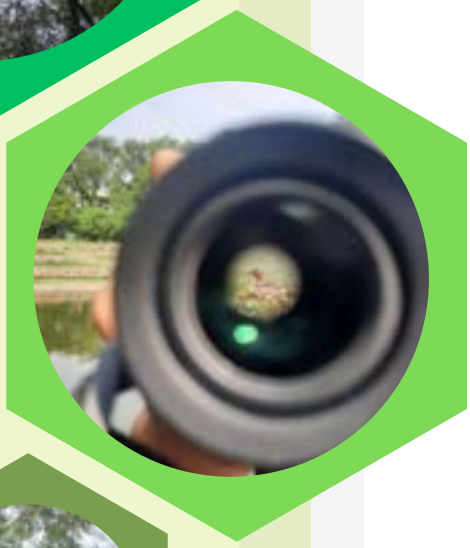

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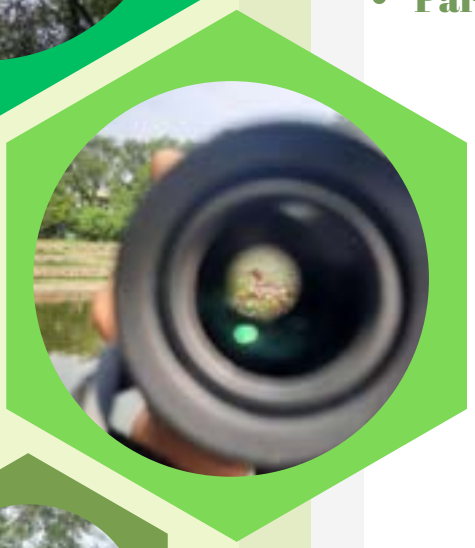

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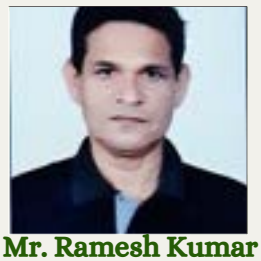

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PRINCIPAL'S MESSAGE

Dear Readers,

It gives me immense pleasure and pride to extend my warm greetings on the landmark occasion of the centenary edition of Panchtatva Parivesh, the esteemed bilingual quarterly magazine published by Srishti – The Environment Society of P.G.D.A.V. College (Evening), University of Delhi. As the Principal of the college, I wholeheartedly acknowledge and applaud the dedication, enthusiasm, and intellectual spirit that the members of Srishti continue to display in their mission to foster environmental awareness and responsibility.

Panchtatva Parivesh is a reflection of the creative and academic excellence of our students and faculty. It serves as a vital platform for meaningful discussion and knowledge exchange on crucial environmental concerns. Its bilingual format promotes inclusivity, allowing its powerful messages to reach a broader audience. Each edition skillfully blends insightful articles, visuals, and research, emphasizing the importance of environmental protection while exploring innovative and sustainable solutions. The thoughtful content encourages readers to introspect and embrace eco-conscious practices in daily life.

Srishti has been instrumental in cultivating environmental consciousness on our campus. Through various initiatives, ranging from tree plantation drives to community outreach programs, it has played a key role in enriching our college's ecological ethos.

At a time when climate change and environmental degradation pose serious global threats, educational institutions like ours must lead by example through advocacy and tangible action. I extend my heartfelt thanks to all contributors whose passion and hard work have shaped this remarkable publication. Your commitment to sustainability is not only admirable but also a source of great inspiration.

Thank you.

Prof. R. K. Gupta
Principal

Convener & Editor-in-Chief's Desk

Dear Valued Readers,

It is with immense pleasure and a deep sense of responsibility that I present to you the latest edition of Panchtatva Parivesh, the quarterly bilingual magazine published by Srishti – The Environment Society of P.G.D.A.V. College (Evening), University of Delhi. As the convenor and chief editor, I feel truly privileged to guide a publication that serves as a meaningful space for environmental dialogue and intellectual engagement within our academic community.

Panchtatva Parivesh reflects our shared dedication to exploring and addressing the urgent environmental issues of our time. With its bilingual approach, the magazine aspires to bridge linguistic divides and make its insights accessible to a wider and more inclusive readership. This edition brings together a rich array of ideas and perspectives from our contributors, all united by a common concern for the planet.

The content featured in this issue, ranging from thought-provoking essays and analytical articles to policy critiques and philosophical explorations, has been carefully curated for its depth, relevance, and research-based insights. We hope these contributions encourage our readers to reassess their relationship with nature and adopt more environmentally conscious ways of living.

I am also deeply grateful to our respected Principal, Prof. R.K. Gupta, for his constant encouragement and visionary support. His dedication to fostering both academic and environmental growth has been instrumental in the successful publication of this magazine.

We warmly welcome your thoughts and feedback, which help us grow and improve with each edition. I sincerely hope this issue of Panchtatva Parivesh offers you not only information and awareness but also inspiration to join us in building a more sustainable and balanced world.

Thank you.

MPandey

Dr. Mayank Pandey
(Editor-in-chief)

PRESIDENT'S MESSAGE

Dear Nature Enthusiasts,

With immense pride and enthusiasm, Srishti – The Environment Society of P.G.D.A.V. College (Evening), University of Delhi, brings to you the latest edition of our bilingual quarterly magazine, Panchtatva Parivesh. As the President of Srishti, it gives me great joy to present this vibrant tapestry of ideas, reflections, and creative expressions dedicated to the cause of environmental protection. This edition not only informs but also invites readers to engage deeply and be inspired by the spirit of sustainability and ecological consciousness.

Inside these pages, you will find compelling articles crafted by our insightful student writers, addressing some of the most urgent environmental challenges of our time. The Vanvasi Diaries section takes you on a journey into the heart of our forests, offering glimpses into the lives and wisdom of communities who live in harmony with nature. In Flora & Fauna, we celebrate the planet's astonishing biodiversity while emphasizing the critical need for its preservation.

Adding a creative flair, our Cartoon Corner presents environmental themes through witty and thoughtful illustrations, offering a light-hearted yet impactful way to reflect on serious issues. Our Quarterly Report highlights the green practices and eco-initiatives carried out across our campus, reinforcing the message that even the smallest actions can lead to meaningful change.

As you delve into this edition of Panchtatva Parivesh, I invite you to consider the power of unity and community in tackling environmental issues. Let the stories, ideas, and artwork within inspire you to take mindful steps toward a more sustainable world. I extend my heartfelt gratitude to the editorial team, contributors, and artists whose dedication and creativity continue to drive Srishti forward. Keep the momentum alive together, we can shape the environmental future we all aspire to.

Thank you.

Pratyush Ranjan

Pratyush Ranjan
President

GUEST ARTICLE

India's Scorching Summers and Soaking Storms: How Climate Change is Turning Up the Heat

Nikita Jha
Copy Editor, Times Now
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This summer, many across India found themselves unable to function without the cool comfort of an air conditioner and a bottle of chilled water. As temperatures climbed relentlessly, cities turned into furnaces and everyday life became an endurance test. From sweltering afternoons to restless, sweaty nights, people were left desperately seeking shade, solace and answers.

But amid this extreme heat, has anyone paused to ask why India is burning up like never before? Experts say the answer lies in climate change, a slow-burning crisis that is now exploding into our everyday lives. Driven largely by human activity-especially the burning of fossil fuels such as coal, oil, and gas-climate change is causing long-term shifts in temperatures and weather patterns. While these shifts occur naturally over centuries, the past few decades have witnessed an alarming acceleration due to industrialisation and deforestation.

This warming has intensified global weather systems, and India is feeling the heat-literally. For instance, winds from increasingly hot desert regions in the Middle East and the Mediterranean are carrying additional heat and humidity to coastal cities like Mumbai. And worryingly, weather patterns that traditionally belonged to the March-May window are now showing up as early as February.

But the most concerning revelation comes from a recent study by IPE Global and Esri India, which sounds the alarm on what lies ahead. According to their climate risk observatory tool, which combines downscaled ensemble and dynamic modelling, India is headed for a dramatic escalation in both extreme heat and rainfall events by 2030.

Some of the Most Alarming Projections

- Heatwave days in major cities, including Delhi, Mumbai, Chennai, Surat, Thane, Hyderabad, Patna, and Bhubaneswar are projected to double by 2030 compared to 1980.
- Intensity of extreme rainfall across India is expected to increase by a staggering 43%, making the country simultaneously hotter and wetter.
- Most districts are likely to experience multiple bouts of erratic and incessant rainfall, pushing already strained urban infrastructure to the brink.

Adding to the pressure are global meteorological phenomena like El Niño and La Niña, which, according to experts, are expected to gain stronger momentum. This could result in more abrupt climate extremes, think flash floods, cyclones, storm surges, and scorching heat.

It's time we stopped seeing these weather events as isolated incidents, and recognise them for what they are: the signs of a planet in crisis, and a future that demands action now.

The Price We're Already Paying

India's vulnerability to climate shocks is no longer a distant warning, it's a lived reality. In the summer of 2024, parts of Delhi recorded temperatures above 49°C, prompting red alerts and hospital admissions due to heat strokes. In Kerala, torrential rains in June 2023 led to landslides and displaced hundreds, while farmers in Punjab watched their wheat crops wither under scorching sun and unseasonal dryness.

These climatic extremes are not just environmental crises; they're economic and social disasters. A World Bank report warns that by 2030, climate change could push over 100 million people globally into poverty, with South Asia being one of the worst-affected regions. In India, the urban poor, street vendors, construction workers, and small farmers remain the most exposed, lacking adequate shelter, insurance, or means to relocate.

Cities on the Edge

Urban India is especially at risk. In megacities like Chennai, Hyderabad, and Kolkata, poor drainage systems and unplanned expansion have turned short but intense rain spells into major flooding disasters. The 2015 Chennai floods and 2021 Hyderabad deluge exposed how unprepared urban infrastructure is for the changing climate.

Additionally, "urban heat islands", areas with concentrated buildings and concrete, trap heat and make cities several degrees warmer than surrounding regions. Without green spaces or

adequate tree cover, these cities become pressure cookers during summer, exacerbating respiratory illnesses, power outages, and water scarcity.

What Needs to Be Done

Tackling climate change demands a multipronged approach, starting with adaptation at the local level. Governments must invest in climate-resilient infrastructure—green buildings, permeable pavements, better stormwater drainage, and early warning systems. Cities like Ahmedabad have implemented Heat Action Plans that include cooling centres and public awareness drives. These are small but essential steps.

On a national level, India needs to aggressively shift toward renewable energy. The country has made progress under the National Solar Mission, but coal still makes up over 70% of energy production. Investing in wind, solar, and hydropower not only cuts emissions but also creates green jobs and improves energy security.

Equally important is afforestation and water conservation. Restoring wetlands, planting native tree species, and protecting mangroves can reduce flood risks and create carbon sinks. Citizens can also contribute through rooftop gardens, rainwater harvesting, and reduced consumption.

Youth and Climate Activism

A growing movement of young climate activists is helping change the narrative. Campaigns like *Fridays for Future India* and activists like *Disha Ravi* are drawing attention to the need for climate justice. The youth are pushing for accountability, transparency, and science-based policymaking, a refreshing counter to the often sluggish political response.

The Role of Media and Education

Climate literacy is crucial. Schools and colleges must integrate climate science and sustainability into their curricula. Media platforms, influencers, and filmmakers can play a powerful role in translating complex climate data into stories people can understand and relate to. From documentaries on the Himalayan glaciers to Instagram reels on waste segregation, every bit of awareness counts.

Conclusion: Hope Through Action

While the projections are sobering, the future is not set in stone. With the right policies, public awareness, and global cooperation, we can still slow down and adapt to the changes. But we must act now, because the climate crisis is not waiting for anyone.

The summer heatwaves and the monsoon storms are not seasonal quirks anymore. They are wake-up calls, blaring reminders that climate change is here, and it's personal. How we respond today will determine the kind of world we leave behind for the next generation.

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MANGROVE ALLIANCE FOR CLIMATE: A STEP TOWARDS A GREENER FUTURE

Pratyush Ranjan
22/3402, B.A. Political Science (Hons.)

WHY IN NEWS?

India recently became a member of the **Mangrove Alliance for Climate (MAC)**, an initiative launched at the **United Nations Climate Summit (COP27)** in Egypt. This marks a significant commitment toward conserving one of the planet's most vital ecosystems, **mangroves**, which are increasingly threatened by climate change and human encroachment.

WHAT ARE MANGROVES?

Mangroves are trees and shrubs with characteristically intricate, exposed roots that form type of tropical forest typically located near bodies of water. More importantly, mangroves host the most diverse, beautiful, and resource-abundant ecosystems in the world. However, the rise in deforestation and the looming danger of sea-level rise have threatened the mangroves habitat, putting the area's biodiversity as well as local communities at risk.

Mangroves are often referred to as "nature's nurseries" due to their role as breeding grounds and habitats for a diverse array of marine and terrestrial species. These coastal forests provide vital ecosystem services, including coastal protection, carbon sequestration, support for fisheries and biodiversity.

Mangroves are often misunderstood and undervalued ecosystems. These coastal forests are sometimes perceived as "dirty" or "dead areas", a wasteland that could be cleared in favour of sandy beaches, swanky resorts or other developments.

These myths about mangroves could not be farther from the truth. They are the only trees that thrive in salty waters and improve water quality by filtering out nutrients and sediments. They are also teeming with life: more than 1,500 plant and animal species depend on mangroves. This includes fish and birds who use the shallow waters beneath mangrove trees as nurseries. Research now indicates that mangroves are also critical for larger mammals, such as monkeys, sloths, tigers, hyenas and African wild dogs.

Protecting mangroves and restoring damaged ones also helps combat climate change through carbon sequestration as they are some of the most carbon-rich ecosystems on the planet, storing on average 1,000 tons of carbon per hectare in their biomass and underlying soils. But

mangroves are threatened. Worldwide, a fifth of them have already disappeared. The main driver of mangrove loss is coastal development, when mangrove forests are cleared to make way for buildings and fish or shrimp farms.

"Mangroves are a remarkably diverse and important ecosystem that works in tandem with other marine ecosystems including seagrass beds and coral reefs all of which are essential not only for the health of our ocean, coasts and the biodiversity that they support, but for the wellbeing of humans," said Leticia Carvalho, Head of Marine and Freshwater at the United Nations Environment Programme (UNEP). "We also need to protect and restore our mangroves as they are an important habitat and source of food supplies for many indigenous peoples and local communities around the globe," she added.

To celebrate World Mangrove Day, we have compiled five key benefits of mangrove ecosystems paired with winning photos from the Mangrove Photography Awards, an annual competition partnering with the United Nations Decade on Ecosystem Restoration and the UN Decade on Ocean Science.

TYPES OF MANGROVES

Mangrove Forests encompass a variety of species adapted to different environmental conditions. Some common types of mangroves include:

1. **Red Mangroves:** Known for their distinctive stilt roots that anchor them in the muddy substrate, red mangroves are pioneers of the intertidal zone, with their aerial roots providing habitat for various marine organisms.

2. **Black Mangroves:** Black mangroves are recognized by their pneumatophores, specialized root structures that protrude above the soil surface, facilitating gas exchange in waterlogged conditions.

3. **White Mangroves:** White mangroves are characterized by their glossy leaves and salt excreting glands, which enable them to tolerate high levels of salinity.

GEOGRAPHICAL LOCATION OF MANGROVE FORESTS IN INDIA

In India, mangroves forests are found along the extensive coastline, spanning states such as Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Odisha, West Bengal, and the Andaman and Nicobar Islands. These coastal gems are not only biodiverse havens but also vital sources of livelihood and cultural significance for coastal communities.

INDIA AND MANGROVES

India is home to approximately 4,992 square kms of mangrove cover, accounting for about 0.15% of the country's total geographical area. These ecologically rich forests are primarily distributed along the eastern and western coastlines as well as the island territories. The Sundarbans in West Bengal, which is part of the world's largest mangrove ecosystem, holds the most extensive mangrove area in the country. Other significant mangrove regions include the coastal stretches of Gujarat, Maharashtra, Goa, Kerala, Tamil Nadu, Odisha, and Andhra Pradesh. The Andaman and Nicobar Islands also host dense and diverse mangrove forests. Recognizing their ecological importance, India has accorded legal protection to mangroves under Category I of the Coastal Regulation Zone (CRZ) Notification, 1991, ensuring their conservation and regulated use.

Here are the reasons why mangrove ecosystems are important along with the consequences that can occur if these areas are lost.

1. **Mangroves are climate heroes:** To meet the global climate targets, the world urgently needs to reduce emissions and remove carbon from the atmosphere. Mangroves are critical in this second task. They extract up to five times more carbon than forests on land, incorporating it in their leaves, branches, roots and the sediments beneath them. The salty and oxygen-poor conditions beneath mangrove forests mean that decomposition of organic material happens very slowly. In the right environmental conditions, mangroves can store the carbon they took from the atmosphere for decades, centuries, or even millennia.
2. **Mangroves Protect Against Extreme Weather and Disasters:** Not only do mangroves help prevent the progression of climate change, they also play an important role in limiting its impact. As global temperatures rise, extreme weather events like storms and flood surges are becoming more frequent and severe. The trunks of mangroves absorb the impact of waves, making them an excellent front line of defense that helps to protect higher ground. Restoring and protecting mangroves and valuing their role as a nature based-solution improves resilience of coastal communities and national economies. Along with other measures, investments in mangroves are expected to generate benefits around four times greater than the costs. Mangroves have also been found to be an effective defense against tsunamis, reducing wave heights between five and 35 per cent.

3. **Mangroves are a haven for threatened animals:** Of the over 1,500 species that depend on mangroves for their survival, 15 per cent are threatened with extinction. This number is increasing when looking at mammals: Nearly half of mammals living or feeding in mangrove forests could go extinct in coming years, with trends worsening for most of them. Protecting and restoring mangrove forests thus means bringing back critical habitat for vulnerable animal species like tigers and jaguars. Initiatives in Indonesia and the United Arab Emirates have been recognized as UN World Restoration Flagships for bringing back nature in coastal ecosystems.
4. **Mangroves boost food security:** As biodiversity havens, mangroves support a huge variety of plants and animals, many of them important for food production. They act as nurseries for young fish and home to honey bees. For 1.5 billion people, fish is the most critical source of protein and in low-income food-deficit countries, nearly 20 per cent of the average animal protein intake comes from fish. The disappearance of mangroves would have dramatic consequences for fisheries in developing countries. Conversely, restoring mangroves could add 60 trillion young, edible and commercially valuable fish and invertebrates to coastal waters every year, providing a significant boost to food security as our human population continues to grow.
5. **Mangroves improve and maintain local water quality:** Mangroves' network of roots and lush vegetation filters pollutants and traps sediments, preventing contamination of the waterways and protecting the habitats and the species within them. Local groups and those that live near the rivers, lakes, or other bodies of water nearby are also protected by the trees' maintenance of the water quality.
6. **Mangroves provide essential resources for people:** Mangrove forests are rich in natural resources, offering everything from medicinal plant extracts to leaves used for tea and livestock feed. They support the livelihoods of millions, especially fishermen who depend on the abundant fish found in these waters. Remarkably, around 80% of the global fish catch is linked to mangrove ecosystems through their role in marine food webs. These forests are not only visually stunning but also vital to both people and wildlife. Canopy Project helps protect mangroves in India and Bangladesh by planting trees, supporting local communities, and restoring areas affected by climate change.

THREATS FACED BY MANGROVE FORESTS: NAVIGATING THE PERILS OF COASTAL DEVELOPMENT

Mangrove forests are under threat from various human activities and natural phenomena, including:

1. **Deforestation and Degradation:** Mangrove forests are often cleared for aquaculture, agriculture, urban development, and infrastructure projects, leading to habitat loss and fragmentation. Deforestation and degradation disrupt ecosystem functions, endanger biodiversity, and compromise the resilience of coastal ecosystems.
2. **Climate Change Impacts:** Rising sea levels, extreme weather events, and ocean acidification linked to climate change pose significant threats to mangrove forests. Increased temperatures and changing precipitation patterns can alter mangrove distribution and growth, leading to habitat loss and reduced resilience to environmental stressors.
3. **Pollution and Habitat Destruction:** Pollution from industrial activities, shipping, and coastal development can degrade mangrove habitats and compromise water quality. Habitat destruction, including dredging, land reclamation, and shoreline modification, further exacerbates the degradation of mangrove ecosystems.

CONSERVATION OF MANGROVE FORESTS

To ensure the long-term survival of mangrove forests, conservation efforts must address the following priorities:

1. **Policy and Governance:** Strengthen policy frameworks and governance mechanisms to protect mangrove forests from deforestation, degradation, and unsustainable development. Implement and enforce regulations that promote sustainable land use practices, protect critical habitats, and empower local communities in decision-making processes.
2. **Community-Based Conservation:** Engage local communities as stewards of mangrove ecosystems, providing opportunities for livelihood diversification, capacity building, and alternative income generation. Foster partnerships between government agencies, non-profit organizations, and community groups to develop collaborative management plans and support community-led conservation initiatives.

3. **Ecosystem-Based Management:** Adopt an ecosystem-based approach to mangrove conservation and management, considering the interconnectedness of ecological, social, and economic factors. Integrate traditional knowledge, indigenous practices, and scientific expertise into management strategies to ensure cultural relevance, ecological integrity, and socio-economic sustainability.
4. **Research and Monitoring:** Invest in research and monitoring programs to improve our understanding of mangrove ecology, resilience, and responses to environmental change. Collect baseline data, monitor key indicators, and assess the effectiveness of conservation interventions to inform adaptive management strategies and guide decision-making processes.

DEVELOPMENT STRATEGIES FOR MANGROVE FORESTS

Developing and restoring mangrove forests requires careful planning and implementation. Some key strategies include:

1. **Site Selection and Preparation:** Choose locations with suitable hydrological conditions and minimal pollution for mangrove restoration projects. Prioritize areas where mangrove forests can provide maximum ecological and socio-economic benefits.
2. **Species Selection and Propagation:** Select appropriate mangrove species that are native to the region and well-adapted to local conditions. Utilize sustainable propagation techniques such as seed collection, nursery establishment, and transplantation to enhance forest resilience and biodiversity.
3. **Community Engagement and Participation:** Engage local communities as active partners in mangrove forest development initiatives. Foster collaboration, knowledge exchange, and capacity building to empower communities to take ownership of forest conservation efforts.
4. **Monitoring and Evaluation:** Implement robust monitoring and evaluation protocols to assess the effectiveness of mangrove forest development projects. Track key indicators such as tree survival rates, biodiversity levels, and carbon sequestration rates to measure progress and identify areas for improvement.

MANGROVES CAN BOUNCE BACK NATURALLY

Bringing lost ecosystems back to life is a daunting task. However, one of the most effective ways to protect and restore damaged mangroves is through enhanced recognition and implementation of Indigenous Peoples' collective rights and actions across the broader spectrum of environmental governance and rule of law as envisaged in the Kunming-Montreal Global Biodiversity Framework. This is particularly important given that "globally, Indigenous Peoples are custodians of 80 per cent of the planet's biodiversity with 5000 unique traditional cultures and ancestral lands covering 32 per cent of all global land and inland waters across 90 countries."

When communities along the coast of Java, Indonesia, started replanting mangroves to conquer rising sea levels, the results were sobering: only 15-20 per cent of planted saplings survived. The rest was simply washed away with the tides.

With the help of researchers and partners, such as Wetlands International, the villagers tried out a new solution: trapping the mud with seawalls made of natural materials, giving young mangroves space to recover naturally. The results were astounding. Mangrove survival rates shot up from 20 to over 70 per cent. The Building with Nature Initiative has since been recognized as UN World Restoration Flagship for its success. Natural regeneration is now recognized and tried out in other parts of the world, together with other restoration approaches suited to local conditions. Understanding and addressing the drivers of mangrove loss is the first step towards ecosystem restoration.

THE UN DECADE ON ECOSYSTEM RESTORATION (2021-2030)

The UN Decade on Ecosystem Restoration (2021-2030), led by the United Nations Environment Programme, the Food and Agriculture Organization of the United Nations and partners covers terrestrial as well as coastal and marine ecosystems. A global call to action, it will draw together political support, scientific research and financial muscle to massively scale up restoration.

THE UN DECADE OF OCEAN SCIENCE (2021-2030)

The UN Decade of Ocean Science for Sustainable Development (2021-2030), led by UNESCO's Intergovernmental Oceanographic Commission, aims to support efforts to reverse the cycle of decline in ocean health and gather ocean stakeholders worldwide behind a common framework that will ensure ocean science can fully support countries in creating improved conditions for sustainable development of the ocean.

MANGROVES: NATURAL ALLIES IN CLIMATE CHANGE MITIGATION

Mangroves play a crucial role in mitigating the impacts of climate change. According to the 2022 State of the World's Mangroves Report by the Global Mangrove Alliance, these forests help prevent over $65 billion in property damage annually and reduce flood risk for nearly 15 million people.

The **Mangrove Alliance for Climate (MAC)** is a voluntary intergovernmental initiative focused on the protection, restoration, and expansion of mangrove ecosystems. Co-led by the United Arab Emirates (UAE) and Indonesia, its member countries include India, Sri Lanka, Australia, Japan, and Spain. MAC aims to raise global awareness about the importance of mangroves in addressing climate change and promoting them as a natural solution to global warming.

THE SUNDARBANS: A VITAL MANGROVE ECOSYSTEM

The Sundarbans, covering about 10,000 km², 6,000 km² in Bangladesh and 4,000 km² in India, is the largest mangrove forest in the world and a designated UNESCO World Heritage and Ramsar site. Rich in biodiversity, this ecosystem provides a wide range of essential services that support the livelihood of surrounding communities. Locals rely heavily on natural resources such as fish, honey, timber, and nipa palm for both cash income and daily subsistence needs like food and fresh water.

The forest plays a significant role in the local and national economy, yet communities face multiple challenges. Environmental threats such as natural disasters, rising salinity, and human-wildlife conflicts pose ongoing risks. Additionally, socio-economic issues, including poverty, unemployment, limited education, and lack of alternative income sources, further burden the residents. Structural problems like corruption, weak law enforcement, and poor governance result in unequal resource access and overexploitation. Dependency on middlemen to market and transport local products also limits income potential. Furthermore, slow disaster relief and insufficient institutional support hinder recovery and sustainable development.

Despite these challenges, the Sundarbans still function as a resilient ecosystem. Effective conservation, improved governance, and better management policies could significantly enhance the quality of life for residents while ensuring the protection of this vital habitat. Empowering local communities, reducing corruption, and promoting

sustainable livelihoods are crucial to preserving the Sundarbans and maintaining the delicate balance between ecological conservation and human well-being.

CONCLUSION

India recently joined the Mangrove Alliance for Climate (MAC), a global initiative launched at COP27 to protect and restore mangrove ecosystems. Mangroves, found along India's eastern and western coasts, including the Sundarbans, are vital for climate resilience, biodiversity, and livelihoods. They sequester large amounts of carbon, protect coastal communities from storms and floods, and serve as breeding grounds for marine life. However, mangroves face severe threats from deforestation, pollution, climate change, and coastal development. Conservation strategies include stronger policies, community-based approaches, ecosystem-based management, and scientific monitoring. Restoration efforts benefit greatly from natural regeneration, especially when guided by traditional knowledge and local participation. Global initiatives like the UN Decade on Ecosystem Restoration and the Ocean Science Decade emphasize the importance of restoring these ecosystems. With India's commitment to MAC and stronger local efforts, mangroves can continue to thrive and serve as natural allies in climate change mitigation and coastal protection.

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MICROPLASTIC POLLUTION: AN INVISIBLE THREAT!

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Let us start with imagining a world where the air you breathe, the water you drink, and the food you eat, is all laced with invisible plastic particles. It does sound like a disastrous and alarming situation but only when it is recognised. Well, this is neither science fiction nor rhetoric, it's the reality of microplastic pollution, a global crisis silently permeating every corner of our planet.

[Picture Credit: https://im.indiatimes.in]

Microplastics have been defined as synthetic polymer particles smaller than 5mm, often invisible to the naked eye. Microplastics have two different types:

1. **Primary Microplastics:** Manufactured for products (e.g., microbeads in cosmetics, industrial pellets).
2. **Secondary Microplastics:** Result from the breakdown of larger plastics (e.g., bottles, bags, fishing nets).

Why is the title referring to the microplastic pollution as "Invisible Threat"? The reasons lie in the size and detectability of these particles. Nano Plastics (particles <1 µm) are undetectable without advanced technology, therefore making these undetectable to naked vision even when present in your closest and absolute environment and surroundings. This makes it more dangerous than all other pollutants which can be eliminated by humans on

detection. Moreover, the presence of these microplastics is not rare or occasional. In fact, a single plastic bottle can fragment into 10,000+ microplastic particles over decades.

SOURCES OF MICROPLASTIC POLLUTION

There are multiple sources of microplastic pollution which are broadly categorized into two main types: Primary sources and Secondary sources. Further the primary and secondary sources are classified as:

PRIMARY SOURCES

1. **Personal Care Products:** The daily use personal care products have extensive amounts of undetectable and unrecognised microplastics which pose a serious question; are we providing care or harm to our body by the use of these products? Microbeads in exfoliants and toothpaste (banned in India in 2017 via Plastic Waste Management Rules) are a type of microplastic largely harmful for human skin. According to Cheung & Fok (2017), a single face scrub bottle contains ~300,000 microbeads.
2. **Synthetic Textiles:** Synthetic textiles are major producers of microplastics (in the form of fibers). According to Browne et al. (2011), polyester and nylon shed 700,000 fibres per wash. CPCB Report 2020 puts India's contribution as 60% of global textile production, with Tirupur alone generating 100 million garments per year.
3. **Tire Abrasion:** According to Kole et al. (2017), 1.5 million tonnes of microplastics are released globally per year due to tire abrasions/wear and tear. A study conducted by IIT Delhi in 2019 revealed that in Delhi alone, tire wear contributes 28% of PM2.5 pollution.
4. **Industrial Pellets:** These are the pre-production plastics leaked during transport (e.g., 267,000 tonnes per year lost globally; Eriksen et al., 2014).

SECONDARY SOURCES

1. **Plastic Waste Degradation:** 8 million tonnes of plastic enter oceans annually.
2. **Agricultural Plastics:** Mulch films, a type of microplastic pollutant, fragment into soil, contaminating crops and creating various agricultural hazards (e.g., 1.5 million tonnes used in India yearly; NCPCR, 2021).

PATHWAYS TO POLLUTION: HOW MICROPLASTICS INFILTRATE EVERYTHING

Microplastic pollution has infiltrated every facet of our environment, from the depths of our rivers and oceans to the air we breathe and the soil that nourishes our crops. In India's aquatic systems, the Ganges River alone carries a staggering 1.15 billion microplastic particles per day into the Bay of Bengal, while the Yamuna River, particularly along its Delhi stretch, holds an alarming 5,300 particles per cubic meter. The crisis extends into global oceans, with the Great Pacific Garbage Patch accumulating a shocking 1.8 trillion plastic pieces, of which 94% are microplastics. The Indian Ocean, too, bears a heavy burden, with concentrations reaching 1.3 million microplastic particles per square kilometres.

However, the menace is not confined to water bodies, microplastics are airborne as well. Delhi's air contains 16.2 microplastic particles per cubic meter, and even remote locations like the Pyrenees Mountains experience microplastic deposition of 365 particles per square meter daily, carried by winds from far-off urban centres. Our soils are equally compromised, as Indian farmers unknowingly introduce 700 microplastic particles per kilogram into agricultural lands through sewage sludge. A Punjab-based study further revealed microplastic contamination in 80% of soil samples analysed, raising concerns about its infiltration into the food chain. These findings paint a stark picture of an invisible yet omnipresent pollutant, demanding urgent attention to mitigate its far-reaching consequences.

THE ENVIRONMENTAL AND HUMAN HEALTH IMPACTS OF MICROPLASTIC POLLUTION

Microplastic pollution is not just an environmental crisis, it is a silent threat to both ecosystems and human health. In marine environments, over 700 species are affected by microplastic ingestion, with 52% of sea turtles falling victim to this pervasive pollutant. Along the Mumbai coast, a staggering 73% of fish have been found to contain microplastics, raising serious concerns about bioaccumulation in the food chain. Even coral reefs, the rainforests of the sea, are not spared—microplastic exposure has been shown to reduce coral growth by 20%, weakening these vital marine ecosystems.

On land, microplastics disrupt terrestrial ecosystems as well. Earthworms, crucial for soil health, experience a 15% reduction in growth upon exposure, affecting soil aeration and

fertility. Additionally, microplastics alter microbial activity in soil, ultimately leading to reduced crop yields and potential long-term agricultural decline.

The most alarming consequences, however, impact human health. Microplastics have infiltrated our food supply, with 90% of table salt brands found to be contaminated. Worse still, these plastic particles are now found inside us, 77% of humans have PET microplastics in their bloodstream, posing unknown long-term health risks. Studies indicate that microplastics can trigger inflammation and tissue damage in the lungs and gut, potentially leading to chronic illnesses. Furthermore, their role as endocrine disruptors has been linked to infertility and even cancer, raising alarms at a global scale. As microplastics continue their insidious spread, the urgency to address this crisis has never been greater.

CASE STUDIES AND SHOCKING DATA

Microplastic pollution knows no boundaries, infiltrating the planet's most vital ecosystems and even our own bodies. The Ganges River, often revered as a lifeline for millions, has tragically become a microplastic highway, carrying an astonishing 1.15 billion microplastic particles per day into the Bay of Bengal. Shockingly, 95% of this pollution originates from clothing fibres and packaging waste, highlighting the devastating impact of unchecked consumerism. Even the Earth's most remote and pristine environments are not spared, researchers found 12,000 microplastic particles per litre trapped in Arctic ice, proving that pollution has spread to the farthest corners of the planet. However, perhaps the most alarming statistic is the direct impact on human health.

[Picture Credit: https://wwfint.awsassets.panda.org]

A 2019 WWF report revealed that the average person unknowingly ingests 5 grams of plastic every week, the equivalent of swallowing an entire credit card. These sobering revelations underscore the pervasiveness of microplastic contamination and the urgent need for global action before this invisible crisis spirals further out of control.

TURNING THE TIDE: SOLUTIONS AND CHALLENGES IN COMBATING MICROPLASTIC POLLUTION

Addressing the microplastic crisis requires a multi-pronged approach, from stringent government policies to technological innovations and conscious individual choices. India has taken significant steps through the Plastic Waste Management Rules (2016), banning microbeads and plastics thinner than 50 microns, while its Extended Producer Responsibility (EPR) framework holds corporations accountable for recycling their plastic waste.

Globally, the UN Plastic Treaty (2022) seeks legally binding reductions in plastic production, while the EU's Single-Use Plastics Directive (2021) has banned ten of the most harmful plastic products, indicating a shift towards sustainable alternatives. On the technological front, promising innovations are emerging. Advanced washing machine filters can reduce synthetic fibre shedding by 80%, preventing microplastics from entering waterways. In India, scientists at CSIR have pioneered PHA-based biodegradable plastics, derived from agricultural waste, offering a sustainable alternative to petroleum-based plastics.

However, policies and technologies alone cannot solve this crisis, individuals must play their part. Simple lifestyle shifts, such as choosing natural fabrics like cotton or hemp over synthetic materials, and ditching single-use plastics in favour of reusable steel bottles and jute bags, can significantly reduce personal plastic footprints.

Despite these efforts, major challenges remain. Microplastic detection remains inadequate, as no standardized methods exist for identifying nano plastics, making assessment and regulation difficult. The economic toll is immense, with plastic pollution costing the world an estimated $2.5 trillion per year in environmental damage. Perhaps most critically, public awareness is still low, a 2021 CPCB survey found that only 34% of Indians are aware of microplastic pollution, highlighting the need for widespread education and advocacy. Without urgent, coordinated action across all levels of society, the fight against microplastic pollution will remain an uphill battle.

A FINAL CALL TO ACTION

Microplastics are a silent pandemic, threatening ecosystems and human health. While India and the world have taken steps, urgent collaboration is needed. As the UNEP warns: “We cannot recycle our way out of this crisis.”

Microplastic pollution has become a pervasive and invisible threat that silently invades every facet of our environment, from the air we breathe to the food we consume. Its minuscule size and widespread presence make it a formidable challenge, as these particles are often undetectable without advanced technology, making them even more dangerous than other pollutants that can be more easily controlled or eliminated once identified. The alarming rise in microplastics, particularly in our oceans, rivers, and soils, points to the insidious nature of this crisis. What is more concerning is the direct threat it poses to human health, as microplastics have been found in food, water, and even human bloodstreams. While steps have been taken globally and nationally to curb this pollution through bans, regulations, and technological innovations, much remains to be done. Governments, industries, and individuals must collaborate to address this crisis holistically.

Public awareness remains one of the most significant barriers, as many are still unaware of the scale of the problem. Without immediate action, microplastic pollution will only escalate, with severe long-term consequences for ecosystems and human health. Education, policy enforcement, and the adoption of sustainable practices at both individual and industrial levels are essential to turning the tide against this invisible but devastating threat.

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नदी पुनर्जीवन अभियान: संकट और समाधान

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भारत को नदियों की भूमि कहा जाता है। यहाँ की अधिकतर सभ्यताओं का विकास नदियों के किनारे ही हुआ है। सिंधु घाटी की सभ्यता से लेकर आज के महानगरों तक, नदियाँ जीवन का मूल स्रोत रही हैं। वे न केवल जल प्रदान करती हैं, बल्कि कृषि, उद्योग, ऊर्जा उत्पादन, धार्मिक अनुष्ठानों तथा जैव विविधता के संरक्षण में भी महत्त्वपूर्ण भूमिका निभाती हैं। गंगा, यमुना, गोदावरी, नर्मदा, कावेरी जैसी नदियाँ भारत की सांस्कृतिक चेतना का प्रतीक हैं। परंतु पिछले कुछ दशकों में अत्यधिक शोषण, प्रदूषण और जलवायु परिवर्तन के कारण ये जीवनदायिनी नदियाँ संकटग्रस्त हो गई हैं। इसी संदर्भ में भारत सरकार तथा विभिन्न संस्थाओं द्वारा "नदी पुनर्जीवन अभियान" चलाया जा रहा है, जो कि एक समयानुकूल और आवश्यक पहल है।

भारत में नदियों की वर्तमान स्थिति

भारत की लगभग सभी प्रमुख नदियाँ किसी न किसी रूप में प्रदूषण, अवैध दोहन, जल प्रवाह की कमी और रेत खनन की समस्या से जूझ रही हैं। **गंगा**, जो देश की सबसे पवित्र और धार्मिक नदी मानी जाती है, अब विश्व की सर्वाधिक प्रदूषित नदियों में गिनी जाती है। केंद्रीय प्रदूषण नियंत्रण बोर्ड (CPCB) के अनुसार, उत्तर प्रदेश के कानपुर, वाराणसी, प्रयागराज और बिहार के पटना जैसे शहरों में गंगा का जल स्नान योग्य तक नहीं रह गया है। **यमुना**, दिल्ली से होकर बहने वाली नदी, लगभग 22 किलोमीटर की शहरी धारा में ही 70 प्रतिशत से अधिक प्रदूषण का भार उठाती है। इसमें अधिकांश सीवेज अपशिष्ट बिना शोधन के सीधे मिलते हैं। **गोदावरी**, जो दक्षिण भारत की सबसे लंबी नदी है, अनेक क्षेत्रों में ग्रीष्म ऋतु में सूख जाती है। इसके अलावा नर्मदा, साबरमती, कृष्णा, ताप्ती और ब्रह्मपुत्र जैसी नदियाँ भी समय-समय पर संकट की स्थिति में देखी गई हैं।

संकट के कारण

नदी संकट के पीछे अनेक जटिल और आपस में जुड़े हुए कारण हैं, जो प्राकृतिक और मानवजनित दोनों प्रकार के हैं:

1. **औद्योगिक अपशिष्ट**: आधुनिक औद्योगिकीकरण के दौर में अनेक फैक्ट्रियाँ, विशेष रूप से रसायन, वस्त्र, चमड़ा और कागज उद्योग, अपने विषैले अपशिष्ट बिना किसी उपचार के सीधे नदियों में प्रवाहित कर देती

हैं। इन रसायनों में भारी धातुएँ, अम्ल, क्षार, रंग और विषैले कार्बनिक पदार्थ शामिल होते हैं जो जल जीवन को नुकसान पहुँचाते हैं और मनुष्यों के लिए भी घातक होते हैं।

2. **घरेलू सीवेज**: भारत के अधिकांश शहरी क्षेत्रों में सीवेज शोधन की पर्याप्त व्यवस्था नहीं है। मल-जल और घरेलू कचरे को सीधे नालों के माध्यम से नदियों में छोड़ा जाता है। यह अपशिष्ट जैविक प्रदूषकों से भरपूर होता है जिससे जल में ऑक्सीजन की मात्रा घटती है और जल में रहने वाले जीव-जन्तु मारे जाते हैं।
3. **अवैध रेत खनन**: नदियों से रेत का अत्यधिक और अनियंत्रित दोहन न केवल उनके भौतिक स्वरूप को प्रभावित करता है, बल्कि जलधारण क्षमता को भी कम करता है। इससे नदी के तल की गहराई बढ़ती है, जिससे तटों का कटाव होता है और बाढ़ की आशंका भी बढ़ जाती है। इसके अतिरिक्त, इससे जलीय जीवों का आवास भी प्रभावित होता है।
4. **अत्यधिक जल दोहन**: कृषि, घरेलू और औद्योगिक उपयोग के लिए नदियों से अत्यधिक मात्रा में जल निकाला जाता है, जिससे उनका प्राकृतिक प्रवाह बाधित होता है। विशेषकर सिंचाई हेतु की जाने वाली नहरें और बाँध नदियों के जल की मात्रा को घटा देते हैं। इसका परिणाम यह होता है कि नदियाँ गर्मियों में सूख जाती हैं या उनके प्रवाह में ठहराव आ जाता है।
5. **वनों की कटाई**: नदी जलग्रहण क्षेत्रों में अंधाधुंध वनों की कटाई से वर्षा जल का संचयन घटता है और भूजल पुनर्भरण की प्रक्रिया बाधित होती है। इससे नदियों में जल का प्रवाह असंतुलित होता है और जल स्तर में गिरावट आती है। वनों के अभाव में मिट्टी का कटाव भी बढ़ता है जिससे नदियाँ गाद से भर जाती हैं।
6. **नदी तटों पर अतिक्रमण**: शहरीकरण के विस्तार के कारण नदी तटों पर अवैध निर्माण और अतिक्रमण तेजी से बढ़ा है। इससे नदियों की प्राकृतिक दिशा और गति बाधित होती है, जिससे जलभराव और बाढ़ की स्थिति उत्पन्न होती है। इसके अलावा, तटवर्ती वनस्पति और पारिस्थितिक तंत्र भी नष्ट हो जाते हैं।

पर्यावरणीय और सामाजिक प्रभाव

नदियों के संकट का प्रभाव केवल पर्यावरण तक सीमित नहीं है, बल्कि यह सामाजिक, आर्थिक और स्वास्थ्य से जुड़े पहलुओं को भी प्रभावित करता है।

- **जन स्वास्थ्य:** प्रदूषित जल के कारण दस्त, हैजा, टाइफॉइड, हेपेटाइटिस जैसे जलजनित रोग फैलते हैं, जो विशेषकर बच्चों और वृद्धों के लिए घातक सिद्ध हो सकते हैं।
- **कृषि:** दूषित जल से सिंचाई करने पर फसलों की गुणवत्ता और उपज में गिरावट आती है, जिससे खाद्य सुरक्षा पर खतरा उत्पन्न होता है।
- **मछली पालन:** जल में ऑक्सीजन की कमी और विषैले तत्वों की उपस्थिति जलीय जीवों के लिए विनाशकारी होती है, जिससे मछुआरों की आजीविका पर प्रतिकूल प्रभाव पड़ता है।
- **बाढ़ और सूखा:** नदियों का असंतुलित प्रवाह और जल संचयन की क्षमता में कमी, बाढ़ और सूखे जैसी चरम मौसमी घटनाओं की आवृत्ति और तीव्रता को बढ़ाते हैं।

सरकारी प्रयास

भारत सरकार और राज्य सरकारें मिलकर विभिन्न योजनाओं और कार्यक्रमों के माध्यम से नदी पुनर्जीवन की दिशा में काम कर रही हैं।

1. **नमामि गंगे योजना:** भारत सरकार द्वारा 2014 में शुरू की गई एक प्रमुख राष्ट्रीय मिशन है, जिसका उद्देश्य गंगा नदी को स्वच्छ, अविरल और प्रदूषणमुक्त बनाना है। इस योजना के अंतर्गत सीवेज ट्रीटमेंट प्लांट्स का निर्माण, घाटों और शवदाहगृहों का आधुनिकीकरण, औद्योगिक अपशिष्टों की निगरानी, जैव विविधता का संरक्षण, गंगा ग्रामों का विकास और व्यापक जनजागरूकता अभियान चलाए जा रहे हैं। यह परियोजना बहु-आयामी दृष्टिकोण अपनाकर गंगा नदी के पारिस्थितिक तंत्र को पुनर्जीवित करने का प्रयास करती है और इसे एक जन आंदोलन का रूप देने पर बल देती है।
2. **यमुना एक्शन प्लान:** यमुना एक्शन प्लान जापानी सरकार के सहयोग से भारत सरकार द्वारा संचालित एक दीर्घकालिक परियोजना है, जिसका उद्देश्य यमुना नदी को प्रदूषणमुक्त बनाना और उसके जलगुणवत्ता में सुधार लाना है। इस योजना के तहत घरेलू सीवेज का उपचार, अपशिष्ट जल का प्रबंधन, नदी किनारे बसे नगरों में बुनियादी ढाँचे का विकास, तथा लोगों को नदी संरक्षण के प्रति जागरूक करने जैसे उपाय किए गए हैं। दिल्ली, आगरा और मथुरा जैसे शहरों में इसके तहत कई सीवेज ट्रीटमेंट प्लांट्स स्थापित किए गए हैं। यह योजना जनभागीदारी और अंतरराष्ट्रीय सहयोग का उत्कृष्ट उदाहरण है।

3. **राष्ट्रीय नदी संरक्षण योजना (NRCP):** इस योजना की शुरुआत 1995 में भारत सरकार द्वारा की गई थी, जिसका उद्देश्य देश की प्रमुख नदियों को प्रदूषण से मुक्त करना है। यह योजना केंद्रीय पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय के अंतर्गत चलती है और अब तक 34 से अधिक नदियों को कवर किया जा चुका है। योजना के अंतर्गत सीवेज शोधन संयंत्रों का निर्माण, सार्वजनिक जागरूकता अभियान, घाटों का जीर्णोद्धार, और अपशिष्ट प्रबंधन जैसे कार्य शामिल हैं। इसका मुख्य उद्देश्य नदियों की जल गुणवत्ता को सुधारना, पारिस्थितिक संतुलन बनाए रखना और स्थानीय समुदायों की सहभागिता को सुनिश्चित करना है।

4. **राज्य स्तरीय पहलें:** राज्य सरकारों ने भी अपने स्तर पर नदी पुनर्जीवन हेतु कई योजनाएँ प्रारंभ की हैं। महाराष्ट्र की गोदावरी पुनर्जीवन योजना में नदी के स्रोत क्षेत्रों में वनीकरण, जल संरक्षण, और गाद निकासी जैसे कार्य किए जा रहे हैं। इसी तरह तमिलनाडु की कावेरी रिवर रीहैबिलिटेशन योजना के अंतर्गत नदी के प्रवाह क्षेत्र में जल संचयन, जैव विविधता संरक्षण, तथा जलग्रहण क्षेत्रों का पुनर्निर्माण किया गया है। इन पहलों में स्थानीय समुदायों की भागीदारी को विशेष महत्व दिया गया है जिससे परियोजनाओं की स्थायित्व और सफलता सुनिश्चित हो सके।

सामाजिक और नागरिक भागीदारी

सरकारी प्रयासों के साथ-साथ समाज की भागीदारी भी अनिवार्य है।

- **रैली फॉर रिवर्स (ईशा फाउंडेशन):** इस अभियान के माध्यम से पूरे भारत में नदियों की स्थिति पर जनजागरूकता फैलाई गई और नीति निर्माताओं तक किसानों व आम जनता की आवाज़ पहुँचाई गई।

- **आर्ट ऑफ लिविंग:** इस संस्था ने बेंगलुरु में कई झीलों और नालों का पुनर्जीवन किया और सामुदायिक सहभागिता द्वारा जल प्रबंधन के सफल उदाहरण प्रस्तुत किए।

- **नदी बचाओ आंदोलन:** विभिन्न राज्यों में चलाए गए स्थानीय आंदोलनों ने नदियों की सफाई, अतिक्रमण विरोध, और जन भागीदारी के माध्यम से सकारात्मक प्रभाव डाला।

- **ग्राम पंचायतें और शिक्षण संस्थान:** ग्रामीण स्तर पर पंचायतें तालाबों और नदियों की सफाई, जल संरक्षण योजनाएँ तथा वृक्षारोपण जैसे कार्यों में सक्रिय भूमिका निभा रही हैं। स्कूल-कॉलेजों में विद्यार्थियों को जल संरक्षण की शिक्षा दी जा रही है और उन्हें नदी पुनर्जीवन अभियानों से जोड़ा जा रहा है।

समाधान की दिशा में सुझाव

नदी संरक्षण हेतु सख्त कानूनों को बनाना ही पर्याप्त नहीं है, बल्कि उनका प्रभावी क्रियान्वयन भी जरूरी है। सभी नगरों और कस्बों में आधुनिक सीवेज ट्रीटमेंट प्लांट्स की स्थापना से घरेलू जल प्रदूषण को रोका जा सकता है। जलग्रहण क्षेत्रों में बड़े पैमाने पर वृक्षारोपण और वनों की बहाली से भूजल पुनर्भरण में वृद्धि होती है, जिससे नदियों का प्राकृतिक प्रवाह बना रहता है। कृषि क्षेत्र में जल संरक्षण तकनीकों जैसे ड्रिप सिंचाई और मल्चिंग को बढ़ावा देना आवश्यक है। इन सबके साथ-साथ स्थानीय समुदायों की भागीदारी सुनिश्चित करनी होगी ताकि वे योजना निर्माण और कार्यान्वयन में सक्रिय रूप से जुड़े रहें। विद्यालयों और विश्वविद्यालयों में नदी संरक्षण से संबंधित शिक्षा और जागरूकता अभियान चलाकर भावी पीढ़ी में जिम्मेदारी की भावना विकसित की जा सकती है।

अंतरराष्ट्रीय उदाहरण और उनका महत्त्व

नदी पुनर्जीवन की आवश्यकता केवल भारत तक सीमित नहीं है, बल्कि यह एक वैश्विक पर्यावरणीय चुनौती है। दुनिया के कई देशों ने समय पर हस्तक्षेप कर अपनी नदियों को पुनर्जीवित किया है, जिससे यह स्पष्ट होता है कि राजनीतिक इच्छाशक्ति, जनभागीदारी और वैज्ञानिक योजना के समन्वय से किसी भी नदी को पुनर्जीवित किया जा सकता है।

टेम्स नदी (लंदन) कभी इतनी प्रदूषित हो चुकी थी कि 1950 के दशक में इसे "मृत नदी" घोषित कर दिया गया था। परंतु ब्रिटेन सरकार द्वारा कठोर प्रदूषण नियंत्रण नीतियाँ लागू करने, सीवेज प्रणाली को आधुनिक बनाने और उद्योगों पर निगरानी रखने से यह नदी आज फिर से जीवन्त हो गई है। अब इसमें जलजीव पुनः पनप रहे हैं और यह पर्यटन का भी केंद्र बन चुकी है।

हडसन नदी (अमेरिका) को भी औद्योगिक कचरे, विशेषकर पॉलीक्लोरीनेटेड बाइफिनाइल्स (PCBs) के कारण अत्यधिक प्रदूषित कर दिया गया था। स्थानीय समुदायों, गैर-सरकारी संगठनों और अमेरिकी पर्यावरण सुरक्षा एजेंसी (EPA) ने मिलकर इसके पुनरुद्धार की योजना बनाई। वर्षों की कानूनी लड़ाई, तकनीकी सफाई और जनसहभागिता से इस नदी का पारिस्थितिक संतुलन फिर से बहाल हुआ।

यांग्त्से नदी (चीन) में निरंतर हो रहे अवैध निर्माण, अत्यधिक जल दोहन और प्रदूषण को रोकने के लिए चीन सरकार ने अनेक कड़े कदम उठाए, जैसे औद्योगिक इकाइयों को स्थानांतरित करना, नदियों के किनारे वृक्षारोपण को

बढ़ावा देना, और जल गुणवत्ता की निरंतर निगरानी। इन प्रयासों ने यांग्त्से के जलस्तर और जैव विविधता की रक्षा में महत्त्वपूर्ण योगदान दिया है।

इन उदाहरणों से यह स्पष्ट होता है कि नदियों का संकट वैश्विक है, परंतु यदि समय पर उचित नीति, तकनीकी समाधान और समाज की भागीदारी हो, तो इनका कायाकल्प संभव है। भारत के नदी पुनर्जीवन अभियान को इन अंतरराष्ट्रीय अनुभवों से प्रेरणा लेनी चाहिए, विशेषकर प्रदूषण नियंत्रण, कानूनी अनुपालन और नागरिक सहभागिता के क्षेत्र में। जब हम वैश्विक उदाहरणों का विश्लेषण करते हैं, तो हमें यह भी समझ आता है कि नदी केवल जलधारा नहीं होती, बल्कि वह सामाजिक, आर्थिक और सांस्कृतिक जीवन का आधार होती है, और उसका संरक्षण हमारी साझी जिम्मेदारी है।

निष्कर्ष

नदी पुनर्जीवन केवल एक पर्यावरणीय कार्य नहीं, बल्कि सामाजिक और सांस्कृतिक पुनरुत्थान का प्रतीक भी है। भारत की नदियाँ हमारी सांस्कृतिक जड़ों और जीवन प्रणाली का हिस्सा हैं। यदि हम आज ठोस कदम नहीं उठाते हैं, तो आने वाली पीढ़ियों को इसके गंभीर दुष्परिणाम झेलने होंगे। अतः यह समय की पुकार है कि हम अपनी नदियों के संरक्षण और पुनर्जीवन को प्राथमिकता दें। "नदी पुनर्जीवन अभियान" को केवल सरकारी परियोजना न मानकर एक जन आंदोलन के रूप में अपनाने की आवश्यकता है। यह अभियान तभी सफल होगा जब हर नागरिक अपनी भूमिका समझे और नदियों के प्रति संवेदनशील हो। यही हमारी आने वाली पीढ़ियों के लिए सबसे बड़ा उपहार होगा। इसके लिए सरकार, समाज, उद्योग, शैक्षणिक संस्थान और नागरिकों को मिलकर कार्य करना होगा। हमारी नदियाँ जीवित रहेंगी, तभी हमारा वर्तमान और भविष्य सुरक्षित रहेगा।

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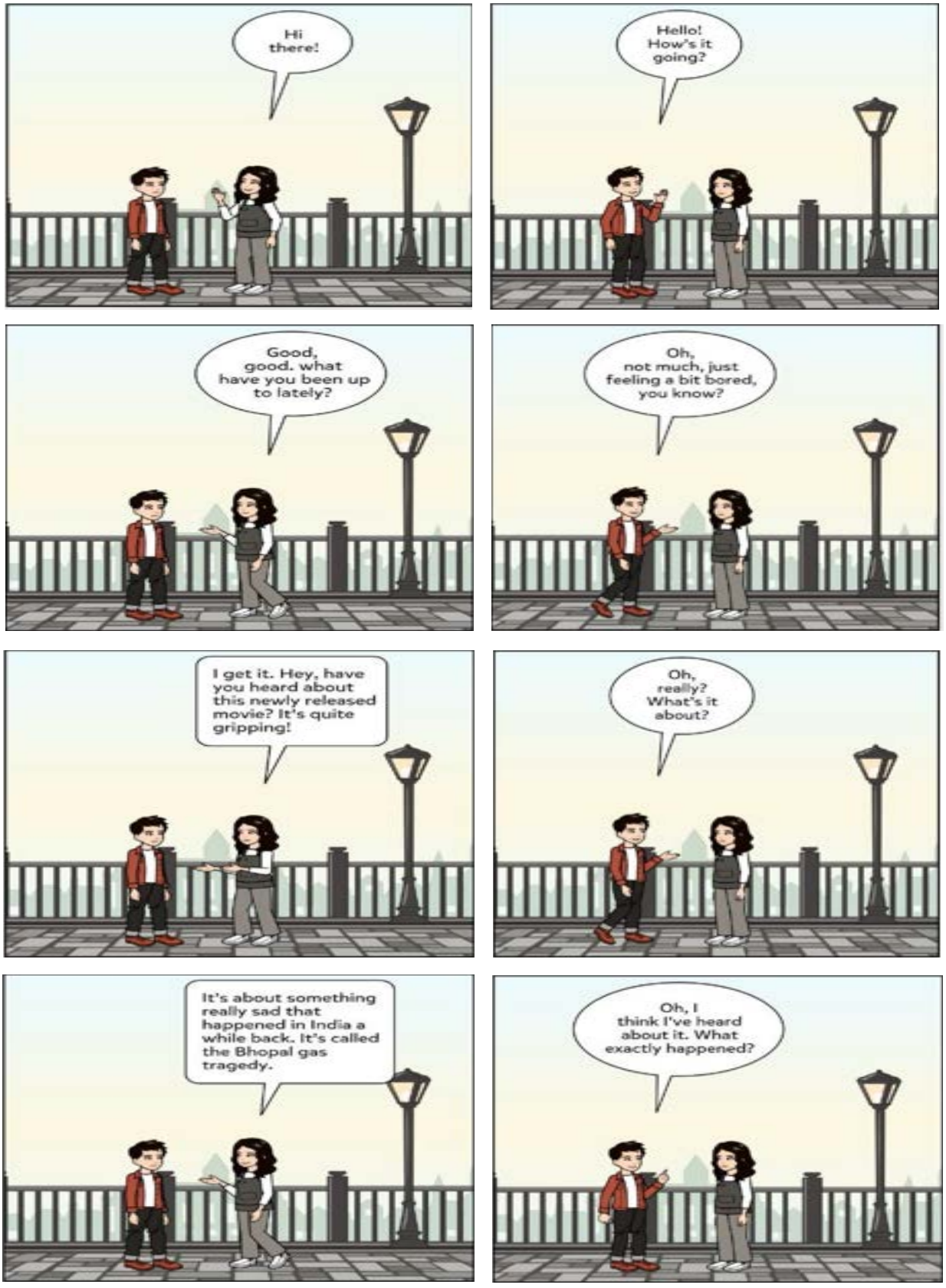
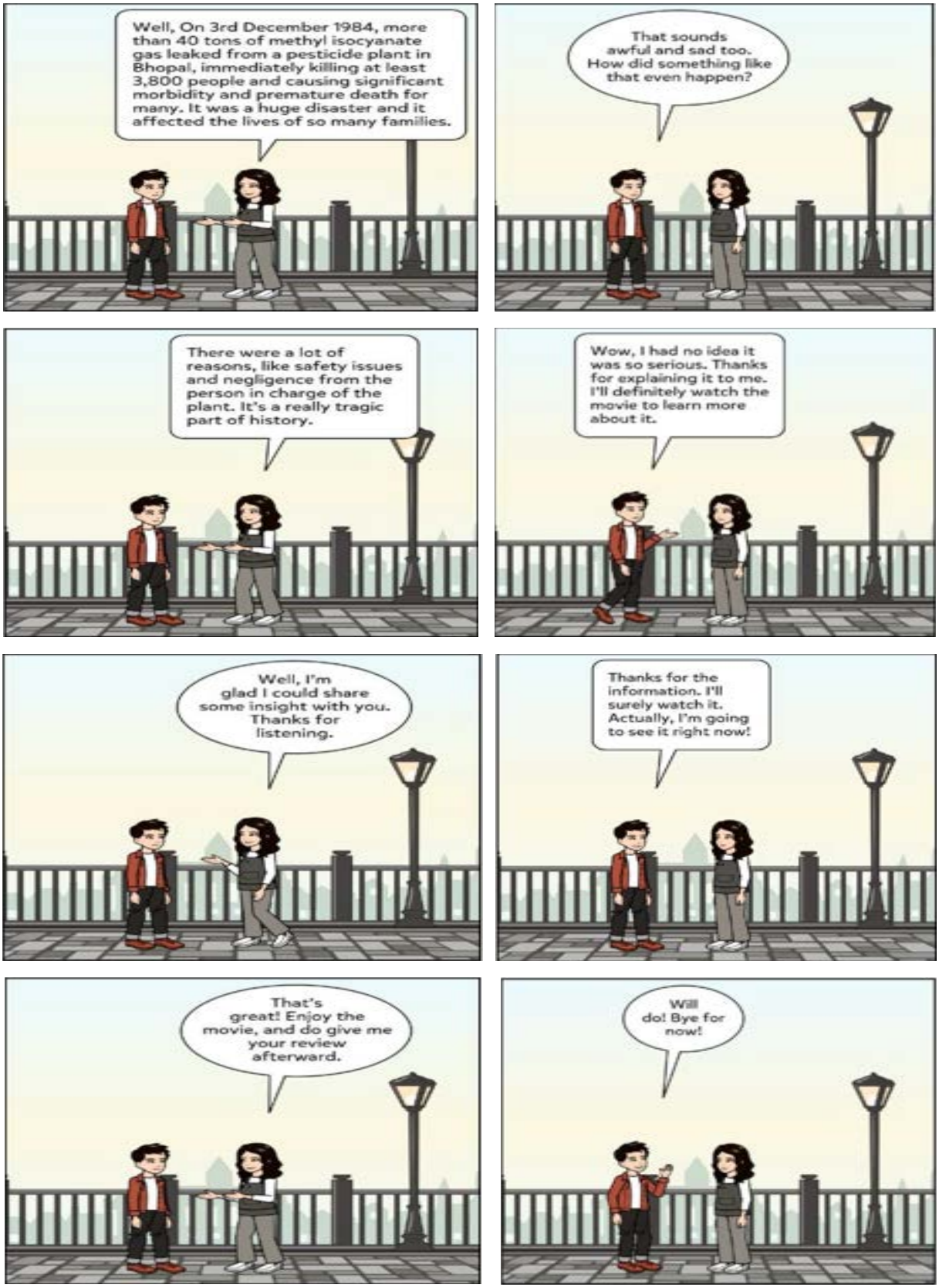
CARTOON CORNER




Well, On 3rd December 1984, more than 40 tons of methyl isocyanate gas leaked from a pesticide plant in Bhopal, immediately killing at least 3,800 people and causing significant morbidity and premature death for many. It was a huge disaster and it affected the lives of so many families.
That sounds awful and sad too. How did something like that even happen?
There were a lot of reasons, like safety issues and negligence from the person in charge of the plant. It's a really tragic part of history.
Wow, I had no idea it was so serious. Thanks for explaining it to me. I'll definitely watch the movie to learn more about it.
Well, I'm glad I could share some insight with you. Thanks for listening.
Thanks for the information. I'll surely watch it. Actually, I'm going to see it right now!
That's great! Enjoy the movie, and do give me your review afterward.
Will do! Bye for now!

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VANVASI DIARIES

THE GUJJAR TRIBE OF JAMMU & KASHMIR

The Gujjars are probably the most prominent tribe of Jammu and Kashmir known for their rich cultural heritage, traditional way of life, and significant contribution towards diversity in the state. Majorly found in the hilly regions of Jammu, the Kashmir Valley, and Ladakh, this community of Gujjars has been able to sustain its different identity in view of its unique customs, language, and lifestyle. This paper discusses the history of the Gujjar tribe, their way of life, and their culture.

[Picture Credit: https://gdb.voanews.com/]

POPULATION

Gujjars make up about 20% of Jammu and Kashmir's population, mainly in hilly regions.

CLOTHING

Men wear kurta-pajamas and turbans, while women wear colorful pherans and headscarves.

OCCUPATION

Primarily involved in cattle rearing with seasonal migration for grazing.

HOUSING

Live in simple, eco-friendly mud and wood structures called kothas.

LANGUAGE

Speak Gojri, closely related to Rajasthani and Gujarati.

[Picture Credit: https://en-media.thebetterindia.com/]

HISTORICAL BACKGROUND OF THE GUJJAR TRIBE

It is believed that the Gujjars migrated into the Indian subcontinent from Central Asia around the 5th century. According to the history tracked in records, they were at one time a nomadic group of pastoralists who gradually settled in the northern regions of India, which include Jammu and Kashmir. The tribe evokes times of bravery and instances of resilience, whereby it played a significant part in saving the area against invasions many times.

The Gujjars of Jammu and Kashmir have a conventional linkage with cattle rearing and agriculture. Their habituation to the cold climate and high altitudes of Ladakh, Kashmir, and the plain areas of Jammu slowly brought them up in diverse terrains. Not only the harsh climate but also the odd living conditions and rigors never shook their cultural moorings as the Gujjars retained their age-old traditions and remained closer to nature.

LIVELIHOOD

The Gujjars are mostly pastoral people; their main occupation is cattle rearing, a tradition in which a considerable population from the tribe is still actively involved. They maintain their seasonal migration and move along with their kine from the lower plains to the higher pastures with the change in weather. This transhumance arrangement forms the mainstay of their economic life and supplies them continuously with milk, meat, and other milk products.

[Picture Credit: https://thelogicalindian.com/]

The traditional houses of Gujjars are called kothas, and they are environmentally friendly, simple mud-and-wood structures that bear every type of climatic change. They usually inhabit far-flung, forested areas that are near grazing grounds. The interiors are modest, and the availability of basic amenities represents their nomadic lifestyle.

[Picture Credit: https://www.hindustantimes.com/]

Womenfolk form an integral part in running the household and daily chores. It is also end that [particularly good at weaving woollen garments for themselves and family members in the shape of shawls and blankets, which are part of the normal costume of the Gujjars.

LANGUAGE AND CULTURE

Gojri is an Indo-Aryan language, closely related to Rajasthani and Gujarati. Enacted by modern education and the introduction of other languages in particular, for example, Urdu and Hindi, Gojri remains the main medium of expression within the community.

The Gujjars are, in themselves, culturally rich in folk music and dances. Raas and Dhol dances are part of their important social functions and festivals, which generally go with traditional instruments like dholak and flute. What is more, this art of dance is more than mere entertainment; it resonates with a way through which oral history and cultural narratives are preserved.

CHALLENGES AND MODERNIZATION

Though the Gujjars have preserved their way of life, they are presented with quite a number of challenges in the modern era. The access to education, health facilities, and employment opportunities is very low, especially in the remote areas where the majority of the population of Gujjars lives. It was accepted as a Scheduled Tribe by the Indian government, which aided them in getting access to some benefits, but development has been at a slow pace.

Their traditional practices are also undergoing a gradual change with the modernization and socio-economic scenario. Several youngsters from amongst the Gujjars migrate to urban areas in search of better opportunities, depleting the number of people following the traditional pastoral lifestyle.

[Picture Credit: https://www.jkpi.org/]

CONCLUSION

The Gujjar tribe of Jammu and Kashmir is a dynamic community that has valiantly retained its cultural identity despite the onslaught of time and modernization. It is on this rich history, unique ways of life, and strong links with nature that they form an integral part of the regional cultural mosaic. In their way to finding a place in tackling contemporary challenges, it becomes very important to support their initiative of preserving heritage while making sure of their integration into the broader socio-economic fabric of the country.

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KNOWLEDGE CHECKPOINT

KNOW OUR STATE/UT

JAMMU & KASHMIR

State Symbols of Jammu & Kashmir (Source: IndDatagraphics)

JAMMU & KASHMIR: A BRIEF ACCOUNT

Areas	42,241 km^2
Coordinates	33°5′24″N 74°47′24″E
Population	Approximate 1.25 Cr (12,541,302)
Density (per sq km)	56 per sq km
Sex Ratio	889/1000 (F/M)
Literacy Rate	67.16% (as per 2011 census)
Capital	Srinagar (summer), Jammu (winter)
Rainfall	Jammu receives about 1,000 mm of rainfall annually, Srinagar around 720 mm.
Snowfall	Srinagar sees about 5-6 feet of snowfall annually, while higher altitudes like Gulmarg and Pahalgam receive 12-16 feet.
Waterfall	Aharbal Waterfall (Also known as the "Niagara Falls of Kashmir"), Kounsarnag Waterfall, Naranag Waterfall, Kokernag Waterfall, Verinag Waterfall.
State Emblem	Ashoka Emblem
State Bird	Kalij Pheasant
State Animal	The Kashmir Stag (Hangul)
State Flower	Common Rhododendron
State Tree	Chinar Tree
Legislature	Bicameral
No. of Assembly Constituency	90
No. of Seats in Rajya and Lok Sabha	4 seats in Rajya Sabha and 5 seats in Lok Sabha
High Court	High Court of Jammu & Kashmir and Ladakh.
International Border	With China and Afghanistan in the north, Tibet in the east and Pakistan in the west. Jammu and Kashmir's international borders are approximately 740 km with Pakistan (LoC) and about 1,597 km with China (LAC), totalling around 2,337 km.
Interstate Border	With Punjab-Approx 120 km

	With Himachal Pradesh-Approx 200km.
Rivers	Chenab, Doda, Dras, Indus, Jhelum, Markha, Neelum, Nubra, Ravi, Shingo, Shyok, Suru (Indus), Tawi, Tsarap, Yapola and Zanskar River.
Lakes	Wular, Nagin, Dal, Mansar, Mansabal Lake.
Highest Elevation	(Nun Peak) 7,135 m (23,409 ft.)
Lowest Elevation	(Chenab River) 247 m (810 ft.)
National Parks	City Forest National Park, Dachigam National Park, Kazinag National Park, Kishtwar High Altitude National Park.
Wildlife Sanctuaries	Bani Wildlife Sanctuary, Gulmarg Wildlife Sanctuary, Hirpora Wildlife Sanctuary, Jasrota Wildlife Sanctuary, Lachipora Wildlife Sanctuary, Limber Wildlife Sanctuary, Nandni Wildlife Sanctuary, Overa-Aru Wildlife Sanctuary, Rajparian (Daksum) Wildlife Sanctuary, Ramnagar Wildlife Sanctuary, Tata kutti Wildlife Sanctuary, Surinasar Mansar Wildlife Sanctuary, Thajwas Wildlife Sanctuary, Tral Wildlife Sanctuary.
Ramsar sites	Hygam Wetland Conservation Reserve, Shalbugh Wetland Conservation Reserve, Surinsar-Mansar lakes, Wular lake, Hokera Wetland.
Main crops	Rice, Maize, Saffron, Wheat, Apples and Walnut.
Major handicrafts	Namdas (floor coverings which are made of woollen and cotton fibres), Papier-mache, Basketry, Wood Carving, Chain Stitch and Crewel Furnishings, Carpet Weaving, Embroidery on Shawls etc.
Major Dances	Rouf dance, Bhand Pather, Bachha Nagma, Hafiza Dance, Wuegi Nachun, Dumhal Dance, Kud Dance.
Main Cuisine	Rogan Josh, Yakhni, Matschgand, Qeleeya, Mujh Gaad, Goshtaba, Monji Haak/Gogji Haak, Nadir Yakhin, Syun Pulaav, Dum Olav, Gogji Raazma, Modur Pulaav, Tschok Wangan, Lyodur Tschaman, Noon Chai or Sheer Chai and Kahwah.
Traditional Clothing	Pheran (A long cloak worn by both men and women, especially during winter), Goncha (A traditional Ladakhi robe worn with colourful sashes),

	Pashmina Shawls (Made from the fine wool of pashmina goats), Shalwar Kameez.
Important Festivals	Eid-ul-Fitr, Navroz, Lohri and Baisakhi, Tulip Festival.
Forts and Monuments	Pari Mahal, Jama Masjid, Bag-e-Bahu Fort, Shankaracharya Temple, Thiksey Monastery, Hari Parbat Fort, Dhanidar Fort.
Major Dams	Baglihar Dam, Dulhasti Dam, Kishenganga Dam, Pakal Dul Dam, Niu Karewa Storage Yusmarg Dam, Salal Dam, Uri Dam, Sewa Dam.
Ek Bharat Shrestha Bharat pairing with	Tamil Nadu

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JAMMU & KASHMIR: HISTORY, GEOGRAPHY, AND ADMINISTRATION

HISTORY

On October 31, 2019, the Jammu and Kashmir Reorganisation Act of 2019 brought Jammu and Kashmir into existence as a Union Territory. The Treaty of Amritsar, which Maharaja Gulab Singh and the British Government signed on March 16, 1846, brought Jammu and Kashmir into being as a single political and geographical entity. Through the Treaty, the Dogra rulers of Jammu, who already ruled over the Ladakh region, gained control over Kashmir. Thus, Maharaja Gulab Singh became the founder ruler of the new region, which now consists of three separate regions: Jammu, Kashmir, and Ladakh.

Jammu and Kashmir, a Union Territory, is rich in history, culture, and the arts. The historical and archaeological sites there are a testament to a regal past. Though it is said that Kashmir is home to the oldest known historical record in the world. Jammu is also mentioned in the old chronicles. Jammu and Kashmir was one of the 565 princely states of India on which the British Empire's supremacy ended on August 15, 1947, at midnight. After the British left, the State of Jammu and Kashmir, which was then ruled by Maharaja Hari Singh, chose to sign an Instrument of Accession to become a part of the Union of India. On October 26/27, 1947, Governor General of India Lord Mountbatten and Maharaja Hari Singh, the ruler of Jammu and Kashmir, executed and signed the Instrument of Accession

On March 5, 1948, the Maharaja named Sheikh Mohammad Abdullah as prime minister and proclaimed the formation of a popular interim government. On June 20, 1949 Proclamation, Yuvraj Karan Singh, the son of Maharaja Hari Singh, was named Regent following his father's involuntary departure from the State due to health concerns.

The State of Jammu and Kashmir was granted a special status by Article 370 of the Indian Constitution on January 26, 1950, the day India became a republic. On May 1, 1951, the Regent, in his capacity as Head of State, issued a proclamation directing the establishment of an elected Constituent Assembly. On August 19, 1952, following the Delhi Agreement, the Constituent Assembly chose Yuvraj Karan Singh as Regent and Sadar-i-Riyasat of the State. The Constitution Order 1954-CO 48, dated 14-5-1954, was issued by the Indian President in May 1954, in accordance with Article 370. The order extended the Indian Constitution to the State, subject to certain adjustments and exclusions.

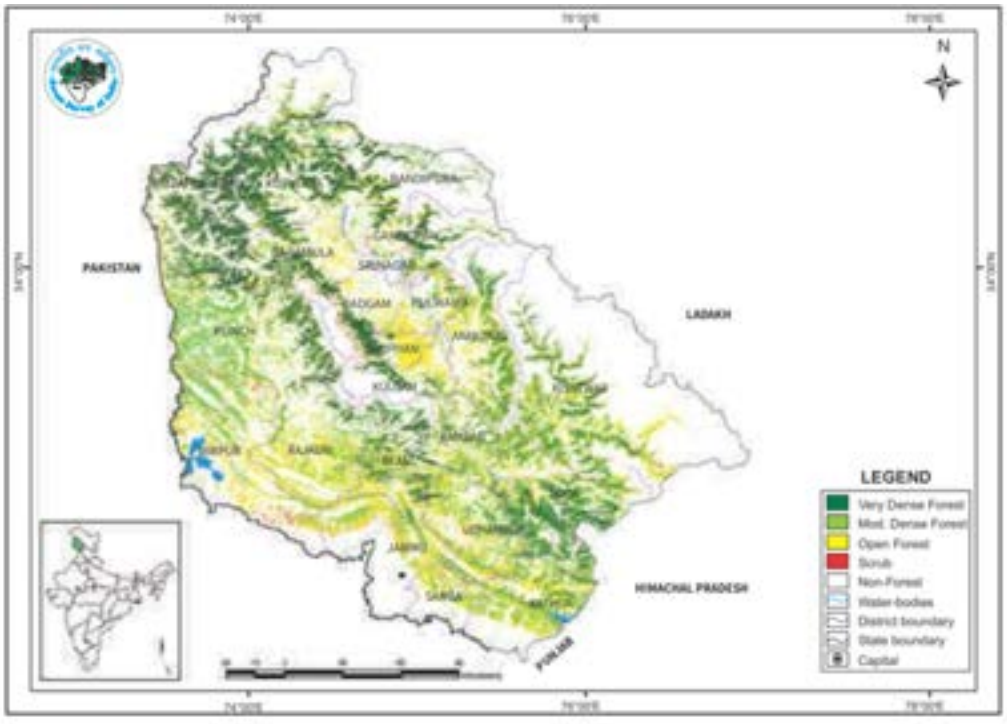
The State Constituent Assembly of Jammu and Kashmir ratified the State's Constitution on November 17, 1956, recognizing the State as an essential component of the Union of India. Despite the fact that the Constitution was adopted on January 26, 1957, its Sections 3 and 4 went into effect right away.

The State's Prime Minister was renamed as the Chief Minister and the Sadar-i-Riyasat as the Governor by the 6th Amendment to the State Constitution, which was approved on March 28, 1965. On August 9, 2019, the Jammu and Kashmir Reorganization Act 2019 was passed, resulting in the reorganization of the state into two Union Territories namely Union Territory of Ladakh and the Union Territory of Jammu and Kashmir.

GEOGRAPHY

Jammu and Kashmir has a geographic area of 101387 sq.km. It lies between Latitude 32°17’ and 37°05’ North and longitude 72°31’ and 80°20’ East. It is divided into two geographic regions viz. Kashmir Valley and Jammu. The higher regions are covered by Pir Panjal, Karakoram and inner Himalayan ranges of mountains. The important river systems of the Union Territory are the Chenab, the Tawi and the Jhelum.

FOREST COVER



[Picture of Forest Cover of Jammu and Kashmir, Union Territory]

The entire geographic area of Jammu and Kashmir, which is 101387 sq.km on this side of the line of control, is made up of 19.95% forest cover, or 20230 sq.km (20.23 lakh hectares). According to all India figure, 24.47% of the country's land is covered by forests. Of the 20230 sq.km of the total forest area, 2551 sq.km is under the reserved forest, 15912 sq.km is under protected forest and the remaining area is unclassified. The Jammu Region has 12066 sq.km of total forest area, followed by the Kashmir Region (8128 sq.km) and the Ladakh Region (36 sq.km). The two Union Territories have so far notified 15,912 sq.km under the Protected Area Network (PAN) which is 15.59% of the total geographical area of the combined Union Territories, comprising 5 National Parks, 14 Wildlife Sanctuaries and 35 Conservation Reserves. The Protected Area (PA) network of the two Union Territories is the highest in the country in terms of area, which is nearly 10% of the country's Protected Area Network.

ADMINISTRATION

Jammu and Kashmir are the two divisions that make up the Union Territory for administrative purposes. The divisions are separated into 20 districts: Kishtwar, Srinagar, Anantnag, Pulwama, Kupwara, Shopian, Ganderbal, Bandipora, Baramulla, Budgam, Kulgam, Udhampur, Reasi, Ramban, Doda, and Samba, Poonch, Rajouri, and Udhampur. Subdivided into 207 Tehsils, the districts are further categorized.

For revenue administration purposes, Tehsils are further subdivided into 523 Niabats, which are further subdivided into 427 GQ Circles, and GQ Circles are further subdivided into 1632 Patwar Halqas, with 6850 Villages in the State. When it comes to maintaining and preserving revenue records for all revenue estates under their purview, patwaries are the lowest ranking revenue officials in the revenue hierarchy but unquestionably the most important in the chain. However, to facilitate development, districts are separated into several development blocks that typically do not align with the boundaries of Tehsils or Sub-Tehsils.

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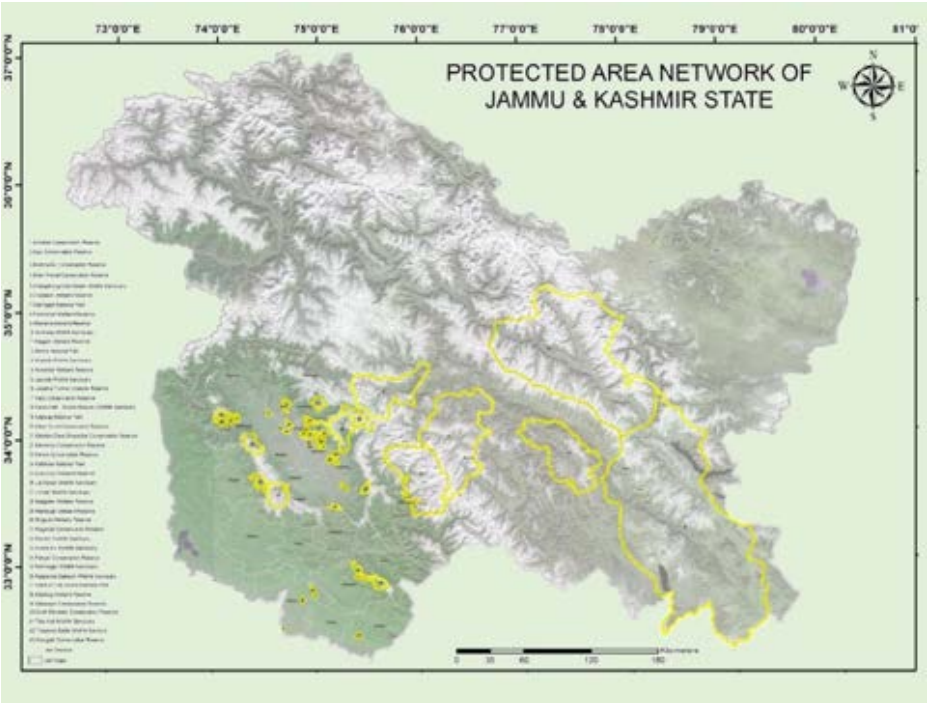
PROTECTED AREAS OF JAMMU & KASHMIR

The immaculate region of Jammu and Kashmir is referred to be the "Paradise on Earth" by countless individuals who have always recognized the beauty of this serene location with a healthy dose of greenery. Jammu and Kashmir, located in the northernmost region of India, is renowned for its breathtaking landscapes, diverse cultural heritage and historical significance. Spanning an area of 2,22,236 square kilometres, the region is divided into three distinct areas: Jammu, the Kashmir Valley and Ladakh. Each of these areas features unique geographical and cultural characteristics.

As of recent data, Jammu and Kashmir's forest cover is approximately 20,230 sq.km, which accounts for 19.95% of its geographical area. The region is home to a variety of protected areas, including 4 national parks, 14 wildlife sanctuaries and 5 Ramsar Sites, which highlight its rich biodiversity and ecological importance. Notably, there are no designated tiger reserves in the region. The protected areas and Ramsar Sites play a crucial role in conserving the diverse flora and fauna of Jammu and Kashmir, ranging from temperate forests to high-altitude wetlands and alpine meadows.



[Picture Credit: https://www.researchgate.net/publication/]

NATIONAL PARK

A stretch of natural land where ecosystems, wildlife and geological formations are preserved by human activity is called a national park. The nation's highest authority takes action to safeguard these natural treasures by enforcing reverence for the park's ecological, geological and aesthetic features and by prohibiting exploitation or occupation within its borders. Under some circumstances, visitors are allowed. In Jammu and Kahmir there are four renowned national parks.

- **Salim Ali (City Forest) National Park:** Salim Ali National Park, also known as City Forest National Park, is located in Srinagar and spans 9.07 sq.km. Named after the renowned ornithologist Salim Ali and established as a national park in 1992, it is home to diverse wildlife, including the endangered Kashmiri Antelope, Monal, Serow, and Snow Cock. The park's flora mainly consists of mangrove shrubbery, making it a birdwatcher's paradise, especially during winter when migratory birds flock to the area. Conservation efforts by organizations like the International Union for Conservation of Nature (IUCN) and World Wildlife Fund for Nature (WWF) have been instrumental in protecting the park's endangered species and maintaining its ecological balance.

- **Dachigam National Park:** Dachigam National Park, situated 22 Kilometres from Srinagar in Jammu and Kashmir, spans an area of 141 Square Kilometres. The name "Dachigam" translates to "ten villages," likely commemorating the ten villages that were relocated to establish the park. Originally created to secure a clean drinking water supply for Srinagar, Dachigam has been a protected area since 1910 and was designated a national park in 1981. It is renowned for being the habitat of the hangul, also known as the Kashmir stag. Additionally, it is located in the Zabarwan Range of the western Himalayas, with an altitude ranging from 1,676 meters to 4,267 meters above sea level. This variation in altitude results in diverse landscapes, from gentle grasslands to rugged cliffs. The park is also home to other wildlife such as musk deer, snow leopards and Himalayan black bears.

- **Kazinag National Park:** Kazinag National Park, covers an area of 90.88 sq.km is located 70 km from Srinagar in Baramulla district, spans altitudes from 1800 to 4300 meters. The Park was designated as a National Park in the 2000. It experiences a temperate climate with warm summers and cold winters, and temperatures ranging from -20 to 30°C. The park's vegetation includes coniferous forests with deodar, fir, spruce, and kail, along with subalpine and alpine scrub. It is home to around 20 mammal

species, including the endangered Markhor, Himalayan musk deer, and common leopard. The park also hosts about 120 bird species, such as the Golden Eagle and Monal Pheasant, and 17 butterfly species, including the Regal Apollo and Common Blue Apollo. The park's diverse ecosystems support a variety of flora and fauna, making it a crucial area for biodiversity conservation. The presence of rare and endangered species highlights its importance for wildlife protection and ecological research.

- **Kishtwar High Altitude National Park:** Kishtwar National Park, located in the Kishtwar district of Jammu and Kashmir, was primarily established to protect the endangered Snow Leopards. Situated about 250 km from Jammu and 40 km from Kishtwar Town, the park was declared a national park on 4 February 1981, covering an area of 2191.50 sq.km. It is one of the seven snow leopard reserves under a project launched by the Central Government. The park's boundaries include the Rinnay River to the north, Kibar Nala catchment to the south, the Great Himalayas to the east, and the Marwa River to the west. The altitude ranges from 1700m to 4800m, encompassing diverse habitats within the Central Crystalline belt of the Great Himalayas.

WILDLIFE SANCTUARY

A wildlife sanctuary is a designated space where animals and birds are protected and conserved in their natural habitats, shielded from illegal acts like poaching and trafficking. Strict prohibitions are in place against the killing, poaching, or capturing of the wildlife residing within these zones. In total there are 14 wildlife sanctuaries found in Jammu and Kashmir.

- **Bani Wildlife Sanctuary:** Bani Wildlife Sanctuary is located in the Kathua district of Jammu and Kashmir. Established in 2019, the sanctuary spans an area of approximately 99.76 sq.km.

  Flora: The sanctuary boasts a rich variety of vegetation, including dense forests of deodar, blue pine, and oak. The undergrowth is populated with shrubs like Berberis, Viburnum, and various medicinal plants, contributing to the sanctuary's ecological diversity.

  Fauna: Bani Wildlife Sanctuary is home to a diverse range of wildlife, including species such as the Himalayan black bear, leopard, musk deer, and serow. It also supports a rich avifaunal community with over 135 bird species, including the Western

Tragopan, Cheer Pheasant, and Bearded Vulture, which are classified as threatened by the IUCN.

Tourism: The sanctuary offers a variety of activities for nature enthusiasts, including bird watching, trekking, and wildlife photography. Its scenic beauty and diverse wildlife make it a popular destination for eco-tourism.

- **Gulmarg Wildlife Sanctuary:** The Gulmarg Wildlife Sanctuary is located in the Baramulla district of Jammu and Kashmir, India. It covers an area of 180 square kilometres and is situated in the Pir Panjal Range of the Western Himalayas. Initially designated as a game reserve in 1981, the area was later elevated to the status of a sanctuary in 1987.

  Flora: The sanctuary is characterized by sub-alpine forests that include species such as silver fir, silver birch, and blue pine, as well as a variety of valuable medicinal plants.

  Fauna: Home to diverse wildlife including Himalayan brown bear, Asiatic black bear, snow leopard, and over 95 bird species.

  Tourism: Includes attractions like the Gulmarg Golf Club and the Gulmarg Gondola, surrounded by the sanctuary's natural beauty.

- **Hirpora Wildlife Sanctuary:** The Hirpora Wildlife Sanctuary is located in the Shopian district of Jammu and Kashmir, 12 km from Shopian town and 70 km south of Srinagar. It covers an area of 341.25 sq.km and was established as a wildlife sanctuary in 1987.

  Flora: The sanctuary features western mixed coniferous forests with Kail pine, spruce, and fir, deciduous sub-alpine scrub forests with Himalayan birch and juniper, and sub-alpine pastures.

  Fauna: Hirpora Wildlife Sanctuary hosts Himalayan brown and black bears, musk deer, leopards, Tibetan wolves, and the critically endangered Pir Panjal markhor, along with around 130 bird species.

  Tourism: The sanctuary offers scenic views and wildlife observation opportunities but faces challenges like deforestation, excessive livestock grazing, and disruption from the Mughal Road.

- **Jasrota Wildlife Sanctuary:** Situated on the banks of the Ujh River, northwards of the village Jasrota, in Jammu and Kashmir. It was founded in 1987 as a wildlife sanctuary and occupies an area of 10.04 square kilometres.

Flora: Dominated by bamboo plantations, with species like Dalbergia sissoo, Acacia catechu, and Lannea grandis. Shrub associates comprise Carissa spinarum, Lantana camara, and Dodonaea viscosa.

Fauna: Home to mammals such as cheetal (axis deer), barking deer, wild boar, and rhesus monkey. Bird species encompass peafowl, red junglefowl, jungle bush quail, green pigeon, and blue rock pigeon.

Tourism: Jasrota Wildlife Sanctuary offers opportunities for bird watching, especially from March to May, and mammal viewing from September to March. The sanctuary's historical and cultural sites, including the Jasrotia palace and temples, add to its appeal. The nearest airport is in Jammu, about 65 kilometres away, making it accessible for visitors.

- **Lachipora Wildlife Sanctuary**

  Lachipora Sanctuary is named after village Lachipora situated in Jammu and Kashmir, about 90 km from Srinagar, along the northern banks of the Jhelum River. The sanctuary spans an area of 37.65 sq.km that varies in elevation from 1,630 to 3,300 meters above sea level.

  Flora: Includes Coniferous Forests (Deodar, Himalayan White Pine, Blue Pine), Broadleaf Forests (Birch, Horse Chestnut, Persian Walnut), and Alpine meadows.

  Fauna: Home to the endangered Markhor (wild goat) and the vulnerable Western Tragopan bird.

  Tourism: Lachipora Wildlife Sanctuary offers unique tourism experiences, including historical trade routes, cultural encounters with Gujjar and Bakarwal communities, rare Kashmir stag sightings, medicinal plants, and challenging trekking routes for adventure enthusiasts.

- **Limber Wildlife Sanctuary**

  Limber Wildlife Sanctuary or Kazing Wildlife Sanctuary (also written as Qazing) is situated in the Baramulla district of Jammu & Kashmir, near the Line of Control, about 70 km from Srinagar. The sanctuary spans an area of 21.76 sq.kmand in 1987, was established as a wildlife sanctuary. It is the fourth national park in the state which focuses the attention towards conserving the rare markhor wild goat.

  Flora: The sanctuary features a variety of vegetation, including dense forests with species like deodar, blue pine, and oak, as well as alpine meadows.

Fauna: Limber Wildlife Sanctuary is home to rare Markhor wild goats, Himalayan musk deer, leopards, brown bears, and a rich avifauna with around 120 bird species and 20 mammal species.

Tourism: The sanctuary is part of an eco-sensitive zone and offers opportunities for wildlife observation and trekking. It was affected by the 2005 earthquake, but government aid has been provided for reconstruction. Visitors can also explore the cultural heritage of nearby villages and enjoy the serene natural beauty.

- **Nandni Wildlife Sanctuary:** The stunning sanctuary, which is located about 28 miles from Jammu and Kashmir, is well-known for its picturesque settings and diverse topography. This 33.34 sq.km wildlife sanctuary was created in 1990 to preserve and safeguard Jammu and Kashmir's diminishing greenery. Additionally, it provides a habitat for endangered species that seek out lush greenery.

  Flora: Known for its immaculate woods and diverse plant life.

  Fauna: The sanctuary is home to eight species of mammals, such as the Grey Langur, Rhesus Monkey, and Leopard, as well as numerous bird species including Pheasants and the Red Jungle Fowl.

  Tourism: Provides treks and safaris; ideally visited in March to May for observing birds and in September to March for observing mammals.

- **Overa Aru Wildlife Sanctuary:** Located in Pahalgam, to the southeast of Srinagar, is one of the area's most well-known tourist destinations. Founded in 1987, the sanctuary covers an area of 511 sq.km. It was established to safeguard those threatened species that were in danger of going extinct. Apart from the diverse range of flora, fauna, and avian inhabitants, this conservation area harbors an extensive assortment of wildfowl.

  Fauna: Abies pindrow, Pinus griffithii, and Juglans regia are among the many conifers that make up the rich vegetation. Herbs such as Taraxacum officinale and Artemisia vulgaris dominate the ground layer.

  Fauna: Host to more than 80 bird species, including endangered ones like the Himalayan Snow Cock and Monal, and 13 species of mammals.

  Tourism: Situated approximately 76 km away from Srinagar, this Wildlife Sanctuary offers the opportunity to view some of the rarest bird, mammal, and avifauna species. The verdant hills, placid mountain vistas, and profound valleys are delightful to observe and take in.

- **Rajparian (Daksum) Wildlife Sanctuary:** The sanctuary, located at 33°36’30"N and 75°31’15"E in the Anantnag district, was established in 1945 and covers an area of 20 sq.km. It ranges in altitude from 1,676 to 4,267 meters above sea level.

  Flora: The flora is characterized by dense coniferous forests, with predominant tree species such as kail pine, spruce, fir, birch, deodar, and juniper. The sanctuary’s diverse ecosystem provides a vital habitat for both flora and fauna, making it an important area for conservation and wildlife observation.

  Fauna: The sanctuary is home to a variety of fauna, including the Himalayan black bear, hangul, musk deer, and serow. Additionally, numerous species of wild birds inhabit the area, contributing to its rich biodiversity.

  Tourism: Situated in the Anantnag district, the Rajparian Wildlife Sanctuary boasts picturesque views of the Rajparian Nallah joining the River Brengi. The peaceful sound of running water, seeing untamed avian species, and taking strolls through dense coniferous woods, alpine meadows, and scrubs are all available to visitors.

- **Ramnagar Wildlife Sanctuary:** Ramnagar National Park is located six kilometres away from Jammu city's main hustle bustle and spans 31.5 sq.km, rising between 430 and 611 meters above sea level. At least 8 animals and 15 bird species can be found in this 1990 established sanctuary, which enhances the local flora and fauna.

  Flora: Features rare plants, herbs, and shrubs typical of the Himalayan region.

  Fauna: Home to mammals like musk deer, brown bears, and leopards, as well as birds like the white-cheeked Indian Mynah, bulbul, and red jungle fowl.

  Tourism: Ramnagar Wildlife Sanctuary, just 6 km from Jammu, offers unique experiences like jeep safaris, trekking, and overnight stays in a hut, providing close encounters with diverse wildlife and scenic beauty.

- **Surinsar Mansar Wildlife Sanctuary:** It is located 42 kilometres away from Jammu city. Established in 1990, spans a vast area of 97.82 sq.km. The two lakes that flow through this sanctuary are the source of its name. Every corner of the sanctuary contains one of the two lakes.

  Flora: The sanctuary features diverse vegetation, including species like Pinus Gerardiana, Ficus Religiosa, and Acacia spp, along with various shrubs and herbs.

  Fauna: The sanctuary features diverse vegetation, including species like Pinus Gerardiana, Ficus Religiosa, and Acacia spp., along with various shrubs and herbs.

Tourism: The best time to visit is between September to March for mammal sightings and March to May for bird watching. The sanctuary offers opportunities for nature walks, bird watching, and exploring the scenic beauty of the area.

- **Tata Kutti Wildlife Sanctuary:** The sanctuary, located at 33° 36′ N and 74° 32′ E in the Poonch district, was established in 2012 and covers an area of 66.27 sq.km. It ranges in altitude from 2300 to 4382 meters above sea level.

  Flora: The flora includes a diverse range of plant species like Fir, Kail, Acer, Walnut, Bird Cherry, Horse Chestnut, White Oak, Berberry, Viburnum, Rosa brunonii, Sorbaria tomentosa, Indigofera heterantha, and Podophyllum hexandrum.

  Fauna: The sanctuary is home to a variety of fauna, including Markhor, Yellow-throated Marten, Leopard, Black Bear, Deer, and Jackal. Unique bird species such as the Western Tragopan and Cheer Pheasant can also be found here.

  Tourism: The Tata Kutti Wildlife Sanctuary provides camping, bird watching, and strenuous walking paths. It is renowned for its breathtaking views of lush green meadows, snow-capped peaks, and a variety of wildlife, offering nature lovers a one-of-a-kind experience.

- **Thajwas (Baltal) Wildlife Sanctuary:**

  The Thajwas (Baltal) Wildlife Sanctuary, located at 34°37′ N and 74°36′ E in the Ganderbal district, was established in 1987 and covers an area of 210.5 sq.km. The sanctuary's altitude ranges from 3,015 to 5,466 meters above sea level.

  Flora: It is renowned for its diverse fauna, with the Musk deer being a major attraction. Other notable wildlife includes the Asiatic Black Bear, Brown Bear, Snow Leopard, Common Leopard, Ibex, and Serow. Bird species such as Monals, Koklas, Partridges, and Snow Cock also inhabit the area.

  Fauna: The sanctuary's flora is equally diverse, featuring tree species like Abies pindrow, Betula utilis, Juglans regia, and Picea sp. The shrub layer includes varieties such as Indigofera sp, Berberis lycium, and Rosa webbiana.

  Tourism: The Thajwas Baltal Wildlife Sanctuary offers trekking, stunning glacier views, bird watching, and is part of the Amarnath Yatra route. It attracts nature enthusiasts and pilgrims, providing a serene environment and diverse wildlife experiences.

- **Tral Wildlife Sanctuary:** Situated in the Pulwama district of Jammu and Kashmir, India. It was established on 26 October 2019, for the protection of the endangered hangul in the region. The sanctuary spans 154.15 sq.km (59.52 square miles).

  Flora: The sanctuary features a diverse range of vegetation, including dense forests of deodar, blue pine, and fir. The undergrowth is rich with shrubs like Viburnum, Berberis, and various medicinal plants, contributing to the sanctuary's ecological diversity.

  Fauna: Tral Wildlife Sanctuary is home to the endangered hangul, with 14 individuals recorded, making it the second most important habitat for this species after Dachigam National Park. Other notable wildlife includes the Himalayan black bear, leopard, musk deer, and various bird species such as the Himalayan monal, koklass pheasant, and snow partridge.

  Tourism: The sanctuary acts as a buffer around Dachigam National Park and Overa-Aru Wildlife Sanctuary. Notable tourist spots include Tarsar and Marsar Lakes, which offer stunning views and opportunities for trekking and bird watching.

RAMSAR SITES

Ramsar Sites are designated wetlands of international importance under the Ramsar Convention, which aims to conserve these critical ecosystems due to their unique biodiversity and ecological functions. These sites often support a variety of wildlife, including migratory birds and aquatic species, and play crucial roles in water purification, flood control, and carbon sequestration. They are recognized for their value in maintaining global biodiversity and supporting local livelihoods. In Jammu and Kashmir, there are 5 Ramsar Sites, each contributing significantly to the region's ecological balance and conservation efforts.

- **Hygam Wetland Conservation Reserve:** Hygam Wetland, designated as a Ramsar site on June 8, 2022, is recognized under site number 2496. This protected area covers an area of approximately 801.8 hectares and is situated in Jammu & Kashmir, specifically at coordinates 34°15'N, 74°31'E, approximately 40 kilometres from Srinagar. The wetland plays a crucial role in providing habitat for diverse species and maintaining ecological balance. It is officially designated as a Wildlife Conservation Reserve, emphasizing the importance of protecting its biodiversity. The unique altitude of 1580 meters above sea level contributes to its distinct ecological characteristics.

Various reports and management plans are available to guide conservation efforts and assess biodiversity within the site, highlighting its significance as a Ramsar Site.

Importance: Hygam Wetland is vital for supporting diverse species, including the Eurasian otter, common carp, and common pochard. Located within the Jhelum river basin, it plays a key role in flood control, aquifer recharge, and water regulation for Wular Lake, while providing essential ecosystem services to local communities. However, it faces threats from siltation and excessive plantations.

- **Shallbugh Wetland Conservation Reserve**: The Shallbugh Wetland Conservation Reserve, designated as Ramsar Site No. 2488 on June 8, 2022, spans an area of 1,675 hectares and is located 18 km from Srinagar in Jammu & Kashmir. This Wildlife Conservation Reserve is crucial for maintaining biodiversity, supporting various species of flora and fauna, and providing essential ecological functions. The wetland is situated on the flood plains of the river Jhelum at an altitude of 1580 m above sea level. Conservation efforts are documented through various management plans and reports, emphasizing the importance of protecting this vital ecosystem.

  Importance: It features extensive floating aquatic vegetation which provide important habitat for over 21 species of resident and migratory birds. The reserve plays a significant role in sustaining local wildlife habitats and supporting migratory bird populations, highlighting its ecological significance and the need for ongoing conservation initiatives.

- **Wular Lake Wetland Conservation Reserve:** Wular Lake, designated as Ramsar Site No. 461 on March 23, 1990, covers an area of 18,900 hectares and is recognized for its ecological significance and unique biodiversity. The management plan for the site focuses on conservation efforts to maintain the lake's health and the livelihoods of local communities that depend on it. Although the site lacks a national legal designation, which poses challenges for its management, the plan aims to protect and conserve the lake's ecological integrity. Various published documents are available for public access, promoting transparency and enhancing awareness of this vital ecosystem. Wular Lake supports diverse flora and fauna, contributing to its biodiversity significance, while local communities rely on it for their livelihoods, underscoring the importance of

sustainable management. Educational resources related to the site encourage public engagement in conservation efforts.

Importance: The lake sustains a rich population of birds. Terrestrial birds observed around the lake include the black-eared kite, Eurasian sparrowhawk, short-toed eagle, Himalayan golden eagle, Himalayan monal, chukar partridge, koklass pheasant, rock dove, common cuckoo, alpine swift, Indian roller, Himalayan woodpecker, hoopoe, barn swallow, golden oriole and others.

- **Hokera Wetland Conservation Reserve:** Hokera Wetland, designated as a Ramsar site on November 8, 2005, is recognized under site number 1570. This protected area covers an area of approximately 1,375 hectares and is acknowledged for its critical ecological significance. The wetland plays a vital role in preserving biodiversity, serving as a habitat for various species of flora and fauna. Its management emphasizes the importance of conservation and sustainable use of natural resources, ensuring that the ecosystem services it provides contribute to local environmental health and human well-being. The site is also supported by geographical information and maps available through various online platforms, highlighting its importance in environmental conservation efforts.

  Importance: Hokera Wetland is vital for biodiversity conservation, providing habitat for various species. It supports ecological functions, holds cultural significance, promotes tourism, serves as a research site, and aids in climate regulation, making it essential for environmental health and community well-being.

- **Surinsar-Mansar Lakes:** The Surinsar-Mansar Lakes, designated as a Ramsar site (Site No. 1573), cover an area of approximately 350 hectares. It was officially designated as a Ramsar site on November 8, 2005, highlighting their ecological significance as a Wildlife Sanctuary. This designation aims to protect the diverse flora and fauna within the lakes, ensuring the conservation of these vital wetland ecosystems for future generations while promoting sustainable management practices in the region.

  Importance: Surinsar Mansar Lake is culturally significant, rich in biodiversity, a tourism hotspot and ecologically vital, warranting conservation efforts to preserve its natural and cultural heritage**.**

MINERALS AND MINES OF JAMMU & KASHMIR

Jammu and Kashmir is rich in mineral resources, with over 50 minerals found in the region. The state has significant deposits of limestone, gypsum, magnesite, dolomite, quartzite, marble, slate, granite, sandstone, copper ore, lead ore, zinc ore, iron ore, coal, chromite, manganese ore, bauxite, and graphite. These minerals are found in various districts, including Jammu, Kashmir, and Ladakh. The mining industry in Jammu and Kashmir provides employment opportunities and contributes to the region's economy. The government regulates mining activities to ensure environmental sustainability and responsible extraction of these valuable resources. The region's unique geology makes it an important location for mineral exploration and extraction, with many minerals having various industrial applications.

References:

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AZADI KA AMRIT MAHOTSAV

PARAMPARA

DR. RAJAGOPALA CHIDAMBARAM

(November 11, 1936 – January 4, 2025)
(Picture Credit: https://www.pib.gov.in)

Dr. R. Chidambaram, a visionary physicist and one of India's most revered scientific leaders, was born on November 11, 1936, in Chennai. A doctorate holder in nuclear physics from the Indian Institute of Science, Bengaluru, he played a key role in shaping India's nuclear capabilities. As Director of the Bhabha Atomic Research Centre (BARC), he was a core member of the Pokhran-I nuclear test (1974) and led the scientific execution of Pokhran-II (1998), affirming India's nuclear strength on the global stage.

He later served as Chairman of the Atomic Energy Commission and Secretary, Department of Atomic Energy (1993–2000), and was appointed Principal Scientific Adviser to the Government of India (2001–2018). A strong advocate of clean energy, he promoted the use of thorium-based reactors, rural electrification through solar technology, and innovations in water purification. He was also instrumental in the creation of Technology Vision 2035, a national strategy aimed at securing a sustainable future through science and innovation.

Beyond nuclear science, Dr. Chidambaram actively encouraged collaborative research in atmospheric science, green chemistry, and nanotechnology. His approach combined deep scientific expertise with a profound sense of environmental and societal responsibility. Dr. Chidambaram's lifelong contributions were recognized with some of the highest national and scientific honours. He was awarded the Padma Shri in 1975 and the Padma Bhushan in 1999 by the Government of India for his outstanding service to the nation. He received the Homi Bhabha Lifetime Achievement Award from the Department of Atomic Energy and the C.V. Raman Birth Centenary Award from the Indian Science Congress Association. The Indian National Science Academy honoured him with the prestigious Aryabhata Medal, and the Indian

Institute of Science, Bengaluru, named him a Distinguished Alumnus. He was also elected Fellow of the Indian National Science Academy (INSA), the Indian Academy of Sciences (IAS), and the National Academy of Sciences, India (NASI), a rare distinction that reflects the depth and impact of his scientific leadership across disciplines.

He passed away on January 4, 2025, leaving behind a legacy that continues to inspire generations of scientists and policy thinkers.

References:

- Office of the Principal Scientific Adviser to the Government of India (https://psa.gov.in)
- Bhabha Atomic Research Centre (BARC) (https://barc.gov.in)
- Indian Institute of Science, Bengaluru - Alumni and Research Records
- Technology Vision 2035 - TIFAC
- Indian National Science Academy (INSA) (https://insaindia.res.in)
- Indian Science Congress Association (https://sciencecongress.nic.in)

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Prof. HARISH CHANDRA VERMA

(April 3, 1952)
(Picture Credit:https://iitk.ac.in)

Prof. Harish Chandra Verma, born on April 3, 1952, in Darbhanga, Bihar, is a renowned Indian experimental physicist and educator whose work has transformed science education across the country. He completed his B.Sc. (Hons) from Patna Science College and pursued M.Sc. and Ph.D. in nuclear physics at the Indian Institute of Technology Kanpur. Beginning his teaching career at Patna Science College in 1979, he later joined IIT Kanpur in 1994, where he served as a professor in the Department of Physics until his retirement and now continues as an Emeritus Professor. Prof. Verma is best known for authoring the two-volume textbook Concepts of Physics, which has become a foundational resource for high school and undergraduate students in India. His clear writing style, intuitive examples, and focus on conceptual clarity have earned him immense respect as a teacher and mentor.

Beyond the classroom, Prof. Verma founded the **National Anveshika Network of India (NANI)** in collaboration with the Indian Association of Physics Teachers, setting up over 25 Anveshikas (innovation labs) across India to promote hands-on physics learning. He also co-founded **Shiksha Sopan**, an NGO working to uplift underprivileged children through education near the IIT Kanpur campus. His vision for education is rooted in accessibility, simplicity, and inquiry-based learning, which he has actively promoted through teacher training programs, public lectures, and science outreach.

In recognition of his immense contribution to education and physics outreach, Prof. Verma has received several honours. In 2017, he was awarded the Maulana Abul Kalam Azad Shiksha Puraskar by the Government of Bihar. In 2020, the Government of India conferred upon him the Padma Shri, one of the country's highest civilian awards, for his outstanding impact on science education. His acceptance of the award with humility and his consistent commitment

to grassroots science learning continue to inspire educators and learners across India. He remains actively involved in mentorship, development of physics experiments, and educational reform.

References:

- https://iitk.ac.in/dora/profile/prof-h-c-verma
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QUESTIONS FROM COMPETITIVE EXAMS BASED ON THE ENVIRONMENT

Correct Options are marked in **Bold** format

- Which region has the world's largest tropical peatland, storing around three years' worth of global fossil-fuel carbon emissions? (UPSC CSE Prelims 2024)

  (a) Amazon Basin

  (b) Congo Basin

  (c) Kikori Basin

  (d) Rio de la Plata Basin

- Regarding PFAS (per and polyfluoroalkyl substances): (UPSC CSE Prelims 2024)

  (1) Widespread in drinking water, food, packaging

  (2) Not easily degraded in the environment

  (3) Persistent exposure leads to bioaccumulation

  Choose the Correct Code:

  (a)1 & 2 only

  (b) 2 & 3 only

  (c) 1 & 3 only

  (d) 1, 2 & 3

- Parasitoid species are found among which of the following:

  (1) Carabid beetles

  (2) Centipedes

  (3) Flies

  (4) Termites

  (5) Wasps

- Select the answer: (UPSC CSE Prelims 2024)

  (a) Only two

  (b) Only three

  (c) Only four

  (d) All Five

- Groundnut, horse-gram, and soybean - how many belong to the pea family (Fabaceae)? (UPSC CSE Prelims 2024)

(a) Only one

(b) Only two

(c) All three

(d) None

- I. Rainfall is one of the reasons for weathering of rocks.

  II. Rainwater contains dissolved CO_2.

  III. Rainwater contains atmospheric O_2.

  Which option? (UPSC CSE Prelims 2024)

  (a) II & III both explain I

  (b) II & III correct, only one explains I

  (c) Only one of II/III is correct & explains I

  (d) Neither II nor III is correct

- Butterflies, fish, and frogs - poisonous species found among: (UPSC CSE Prelims 2024)

  (a) Only one

  (b) Only two

  (c) All three

  (d) None

- **Statement I**: The atmosphere is heated more by incoming solar radiation than terrestrial radiation.

  Statement II: CO_2 and other greenhouse gases absorb longwave radiation.

  Which is correct? (UPSC CSE Prelims 2024)

  (a) I & II true and II explains I

  (b) I & II true but II doesn't explain I

  (c) I true, II false

  (d) I false, II true

- "Certain ants are known cultivators of fungi."

  Which one of the following organisms does this? (UPSC CSE Prelims 2024)

  (a) Ant

  (b) Cockroach

  (c) Crab

  (d) Spider

- The "Miyawaki method" is associated with:

  (1) Urban mini-forests

  (2) Wind energy harvesting

  Which one? (UPSC CSE Prelims 2024)

  (a) 1 only

  (b) 2 only

  (c) Both

  (d) Neither

- Consider the following statements regarding "Global Methane Pledge":

  (1) It is legally binding agreement under the United Nations Framework Convention on Climate Change (UNFCCC).

  (2) India is one of the founding members of the pledge.

  (3) The pledge aims to reduce global methane emissions by at least 30% from 2020 levels by 2030.

  Which of the above statements is/are correct? (UPSC CSE Prelims 2024)

  (a) 1 and 2 only

  (b) 2 and 3 only

  (c) 3 only

  (d) 1, 2 and 3

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FLORA FROM THE COLLEGE

PLANT FROM HERBAL GARDEN: CURRY LEAVES (कढ़ी पत्ता)

(Picture credit: https://assets.lybrate.com/)

Curry leaves (*Murraya koenigii*) are aromatic, glossy, and dark green leaflets that grow on the curry leaf tree, a small to medium-sized deciduous shrub or tree that reaches 4-6 meters (13-20 feet) in height. The leaves grow in pairs along a central stem and are known for their distinct, pungent aroma and slightly bitter, citrus-like taste. Curry leaves are a staple in South Indian and Sri Lankan cuisine, often used for tempering in hot oil to release their essential oils and add depth to dishes. For centuries, curry leaves have been used in Ayurveda for their therapeutic benefits, such as improving digestion, controlling blood sugar, and supporting hair health. The leaves are commonly used fresh but can also be dried or powdered for extended use.

BOTANICAL PROFILE

Curry leaves are native to the Indian subcontinent and belong to the Rutaceae family (the same family as citrus fruits). The tree thrives in tropical and subtropical climates and is widely cultivated in India, Sri Lanka, and Southeast Asia.

NUTRITION FACTS

Although curry leaves are generally consumed in small quantities, they pack a strong nutritional punch. Per 100 grams of fresh leaves, they provide about 108 kcal of energy. They are rich in carbohydrates (18.7 grams), protein (6.1 grams), and dietary fibre (6.4 grams), with minimal fat content (1.0 gram). Curry leaves are an excellent source of calcium, offering approximately 830 mg (83% of the daily value), and also contain iron (0.93 mg), phosphorus (57 mg), and vitamins such as vitamin A (7560 IU, covering 151% of the daily requirement) and vitamin C (4 mg). These nutritional elements contribute significantly to their health-enhancing properties.

HEALTH BENEFITS

- **Supports Digestion:** Curry leaves stimulate digestive enzymes and help in managing indigestion, nausea, and diarrhea.
- **Regulates Blood Sugar:** Studies have shown that compounds in curry leaves can help reduce blood glucose levels, making them beneficial for managing diabetes.
- **Rich in Antioxidants:** Curry leaves contain powerful plant compounds such as alkaloids, flavonoids, and phenols, which protect the body against oxidative stress and cellular damage.
- **Improves Hair Health:** Traditionally used in hair oils and masks, curry leaves promote hair growth, reduce hair fall, and may delay premature greying.
- **Lowers Cholesterol:** Animal studies suggest curry leaves can help lower LDL (bad cholesterol) and triglyceride levels.
- **Anti-inflammatory and Antimicrobial Properties:** Extracts from curry leaves have shown potential in combating bacterial infections and reducing inflammation.

References:

- Indian Council of Medical Research (ICMR). (2021). *Nutritive Value of Indian Foods*.
- Kaur, M. et al. (2014). “Therapeutic potential of *Murraya koenigii* (curry leaves) in health and disease.” *Journal of Pharmacognosy and Phytochemistry*.
- National Institute of Nutrition (NIN), Hyderabad.
- WebMD. (2023). *Curry Leaves Benefits*.
- Ayurveda texts and pharmacopoeia on Indian herbs (Ministry of AYUSH, India).

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VIHANG – THE FLYING VISITORS TO THE COLLEGE

FLYING VISITORS TO THE COLLEGE

COOPERSMITH BARBET

(Photo Credit: https://ebird.org/)

Scientific Name: *Psilopogon haemacephalus*

Common name: Crimson breasted barbet

Hindi name: छोटा बसंता

Description: The Coppersmith Barbet is a small, plump bird measuring about 15-17 cm in length and weighing around 30-50 grams. It is easily recognized by its bright green body, red forehead, and throat patch, along with yellow around the eyes and throat. The underparts are streaked, and the bird has a stout bill adapted for pecking into wood. Its name comes from its repetitive "tuk-tuk-tuk" call, resembling the sound of a coppersmith striking metal.

Habitat: This species is widely found in the Indian subcontinent and Southeast Asia. It prefers open woodlands, groves, gardens, and urban parks. It is commonly seen in cities like Delhi, Mumbai, and Bangalore, where mature trees are present.

Food: The Coppersmith Barbet primarily feeds on fruits, especially figs, but it also eats nectar and small insects. It is often seen foraging in the upper branches of fig trees and other fruiting species.

Nest: Nesting occurs in tree cavities, which the bird excavates itself using its strong bill. Both male and female take part in nest excavation. The nest cavity is usually located in dead branches or trunks of soft-wooded trees.

Breeding Season: In India, the breeding season typically ranges from February to April, though it may vary depending on the region. The female usually lays 2-4 eggs.

IUCN Status: Least Concern (LC); The species is widespread and common with no immediate threats causing a rapid population decline.

References:

- Grimmett, R., Inskipp, C., & Inskipp, T. (2011). *Birds of the Indian Subcontinent*. Oxford University Press.
- BirdLife International. (2024). Coppersmith Barbet – IUCN Red List
- eBird. (2024). Coppersmith Barbet Overview
- Salim Ali. (2002). *The Book of Indian Birds*. Bombay Natural History Society.

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QUARTERLY REPORT

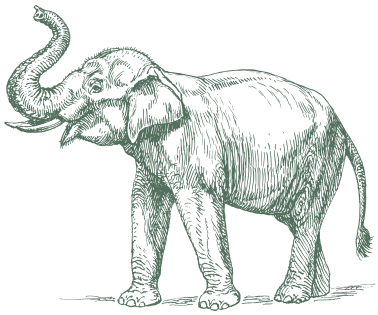
1. **Swachhata Pakhwada:** Srishti – the Environment Society of the college, Municipal Corporation of Delhi (MCD) and Ever Enviro jointly organized three intra-college competitions (Poster Making, Digital Collage and Best-out-of-Waste) to observe Swachhta Pakhwada (Theme: Swachhata Hi Sewa) on September 23, 2024. The names of the winners of the three events were announced on October 02, 2024 in an event organized by the MCD at Shaheedi Park (near ITO).

2. **Talk and Certificate Distribution Ceremony:** Srishti – the Environment Society and Arundhati Center for Bhartiya Ancient Knowledge (IKS Center) organized a talk on September 30, 2024. Chief Guest Prof. R.S. Sharma, Department of Environmental Studies, University of Delhi delivered a talk on 'Ecological Wisdom from Indian Knowledge System for Viksit Bharat'. Mr. Samarth Sharma, CEO, National EduTrust of India was the Guest of Honour in the event. College principal, Chief Guest and Guest of Honour awarded certificates to the participants of 30 – days Environmental Challenge.

3. **IIIrd Certificate Course on Water Entrepreneurship:** Srishti, in collaboration with Jaladhikar Foundation, Skill Council for Green Jobs and Safe Water Network India conducted IIIrd Certificate Course on Water Entrepreneurship (40 Hours) from October 24, 2024 to November 25, 2024 in hybrid mode. The objective of the course was to impart knowledge about the basic concepts of entrepreneurship and provide exposure and skills for water resource management. Twenty-two students from different colleges of University of Delhi were awarded certificate of participation and three faculty members were awarded certificate of trainers. Participants were exposed to practical sessions and field excursions with the theory classes.

4. **Eco Philosophy Summit 2024:** Eco Philosophy Summit 2024 was organized on November 21, 2024 at India International Centre and the college was awarded certificate for its exceptional performance.

5. **Skill Mela:** A skill mela was organised by P.G.D.A.V. College (Evening) on November 26, 2024 in college Premises, under State/District Best Action Research Institution 2024-25 Program (Skill-to Entrepreneurship Program for HEIs) organized by National EduTrust of India. Three committees, viz., IIC, Srishti, Enactus and Cultural Society collaborated to organize the skill mela. The college was awarded Certificate of Excellence by National EduTrust of India.

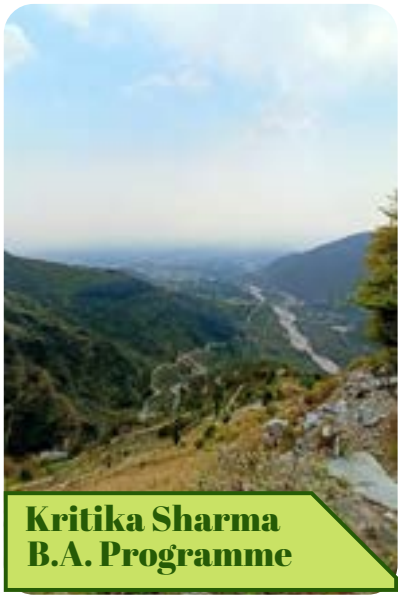


CLICKER'S ZONE

Aaditya Nayak
B.A. Programme

Alka Yadav
B.Sc. Maths (Hons)

Ajitesh Singh
B.Sc. Maths (Hons)



Kritika Sharma
B.A. Programme

ART WORK

SAGAR
BSC MATHEMATICS (HONS)
ROLL NO:- 24/1581

RUCHI RAI
B.A. POLITICAL SCIENCE (HONS.)
ROLL NO:- 22/3417

Anuj Kumar Mondal
B.A. PROGRAMME
ROLL NO:- 24/62

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