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ARANYAM

Forest Wildlife
Environmental Magazine

Protecting Forests
A Fight for Life Itself

Kerala's Wetlands
Nature's Biodiversity Reserve

Battling the Blaze
Kerala's Strategy for Wildfire Management

Majestic Tigers of Sundarbans
Rulers of the Mangroves

A Haven for Birds
Insights from Waterfowl Census in T'puram

Inside
Forestry Club Handbook

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മനുഷ്യ വന്യജീവി
സംഘർഷ ലഘൂകരണത്തിന്

വനം വകുപ്പിന്റെ അടിയന്തര പ്രതികരണ സംവിധാനം

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Cover Shot:
Eurasian Spoonbill
Reji Chandran

editorial

Blessed by the rhythm of monsoon, Kerala is a land of abundant water bodies. Rivers, ponds, lakes, backwaters, paddy fields, coastal lines and Myristica swamps weave through the landscape.

Mangrove forests found along the coastline are part of the wetland ecosystem. Kerala was abundant with mangrove forests since time immemorial and this was quite evident from the works of great explorers like Fahian, Barbosa, Cabral and Vasco da Gama. They have vividly described Kerala's mangrove-rich coastline in their records.

Despite their importance, the 2004 tsunami waves served as a reminder of the need to protect these ecosystems. The Kerala Forest Department has given much priority to mangrove conservation by incorporating it into the Theeravanam Project. Protected mangrove areas include Mangalavanam in Ernakulam, Kadalundi-Vallikkunnu Community Reserve in Kozhikode, mangrove islets of Chettuva in Thrissur and mangrove regions in Kasaragod district. The government has launched various incentive schemes for individuals who plant and protect mangroves. Additionally, mangrove conservation committees have been established to safeguard coastal mangrove forests.

In line with the Ramsar Convention on Wetland Conservation, Kerala is giving special protection to key coastal wetlands like Vembanad-Kol and Ashtamudi, recognizing their global ecological significance.

Rapid urbanization, industrial expansion, and population growth are posing severe threats to Wetlands. Despite their crucial role in maintaining environmental balance, wetlands are often misunderstood as wastelands rather than essential lifelines of nature. The true value of wetlands often becomes evident only in times of crisis—when scorching heatwaves, devastating cyclones, floods and outbreaks of infectious diseases disrupt our lives. Recognizing their significance, this year's World Wetlands Day carries the theme "Protect Wetlands for Our Common Future". In Kerala, the Forest Department is committed to safeguarding these vital ecosystems. However, only through active community participation can we ensure that wetlands continue to protect and sustain life for generations to come.

Ganga Singh IFS
Chief Editor

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Forest and Wildlife Conservation

The Kerala Way

A.K. Saseendran
Minister for Forest and Wildlife

The air we breathe, the water we drink, the food we eat and even the clothes we wear—all essential resources for life on Earth—are gifts of nature. At the heart of this, natural forests play a crucial role in preserving this invaluable heritage for future generations.

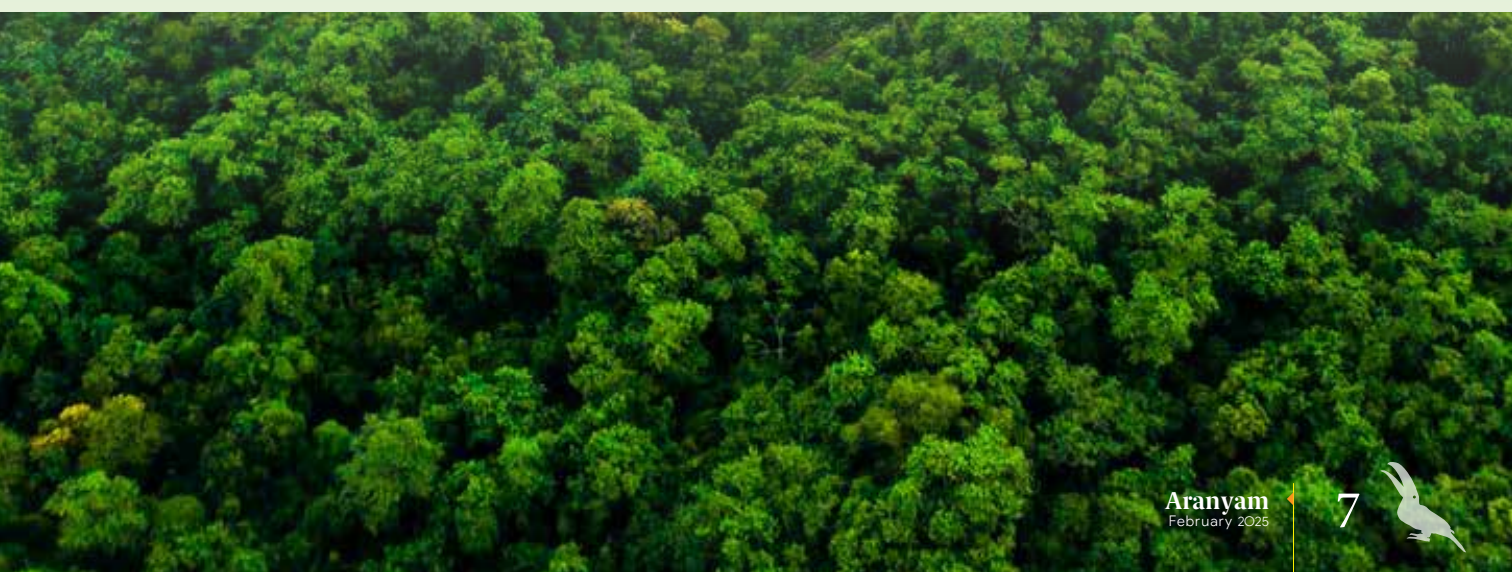
The large-scale destruction of natural habitats is one of the biggest drivers of today's ecological crises. As forests disappear, millions of species face the threat of extinction, and the planet loses essential ecosystem services that sustain life. Unchecked deforestation, often justified in the name of development and industry, is leading to irreversible environmental damage. With shrinking wilderness, wildlife is forced into human-dominated spaces, escalating conflicts between humans and animals. Beyond biodiversity loss, deforestation also fuels the spread of infectious diseases like malaria.

In a bid to protect the rich biodiversity, the Kerala Forest Department has launched a decisive action plan to eliminate invasive plant species like Senna that threaten the natural ecosystems. As part of this, the Department is also replacing these invasive species with native plants that support local biodiversity. This ecological restoration extends beyond the flora: the department is also constructing barriers and ponds to ensure a steady water supply for wildlife, fostering a healthier, more sustainable environment for all living beings within the forest.

One of the greatest challenges to global forest conservation today is the ever-growing threat of forest fires. The devastating wildfires recently witnessed in the U.S. serve as a stark reminder of the destruction they can cause. While Kerala's forests have historically been less affected by such blazes, they are now facing an increasing risk. In response, the Kerala Forest Department has been implementing large-scale strategic plans every year to combat the growing threat of forest fires. The forest department has a comprehensive Fire Management Plan, with a robust alert system designed to detect and prevent fires. The department has continuously refined and strengthened its fire management framework, leading to a significant reduction in the spread of fires, as recent statistics demonstrate.

> Today, the Kerala Forest Department is moving forward on a path that reflects the realization that the greenery on earth and the biodiversity it provides are the foundation for the healthy existence of life.

Protecting our forests is not a task we can afford to take lightly. Through consistent efforts and innovation, the Kerala Forest Department is setting the path forward, ensuring that these natural treasures are safeguarded for generations to come. ▪



Every year, the Forest Department takes precautions to ensure that not even an inch of forest land in Kerala is affected by forest fires. By completing preventive measures, the area of forest area affected by forest fires, which was over 150 hectares, was reduced to 9.50 hectares in 2023 and 7.70 hectares in 2024.

Battling the Blaze:

Kerala's Strategy for Wildfire Management

A.K. Justin Stanley IFS
Deputy Forest Conservator (Wildlife)

Last month, the world watched in shock as wildfires tore through Los Angeles, leaving devastation in their way. Declared a major catastrophe by the U.S., these fires are yet another reminder of the increasing threat posed by wildfires worldwide. From the sprawling urban landscapes of Los Angeles to the dense forests of Kerala, the impact of these raging wildfires is both widespread and alarming. The increasing wildfires remind us that the need for prevention and control is growing day by day.

Kerala, known as "God's Own Country," is blessed with abundant rainfall, thanks to the Southwest Monsoon (June-September) and the Northeast Monsoon (October-December). The state receives an average annual rainfall of 3,000 mm, making it one of India's most water-rich regions. However, shifting climate patterns have led to unpredictable weather events, including Kerala's worst drought in 115 years in 2017, followed by catastrophic floods in 2018 and 2019. These fluctuations have heightened concerns about the increasing risk of wildfires in the state.

Despite receiving heavy rainfall, Kerala's forests are not immune to wildfires. While controlled burns can play a role in maintaining ecological balance, unchecked fires pose a serious threat to biodiversity and forest-dependent communities. Recognizing this, the Kerala Forest Department has given wildfire prevention a top priority, especially during the dry season from February to May, when the risk is at its highest.

Historically, Kerala do not see much of wildfires. However, it primarily affects grasslands and shrub lands rather than dense forests. Over the past decade, the state has reported between 123 and 735

wildfire incidents annually, impacting areas ranging from 308 to 2,986 hectares. However, with climate change exacerbating extreme weather patterns, the frequency and intensity of wildfires could rise, necessitating stronger prevention and mitigation measures.

The Chalakudy Model:
A Game Changer in Fire Management

Various reasons can be attributed to wildfires in Kerala's forests. Recognizing this, the Forest Department implements Fire Management Plans in forest divisions to enhance prevention and control efforts. One such initiative, launched by the Chalakudy Forest Division in 2019-20, has stood out for its strategic approach and effectiveness in wildfire prevention.

Under this model, the division was divided into 32 blocks, each overseen by a Section Forest Officer. These blocks underwent rigorous assessment based on historical fire data, fire-prone zones and availability of water sources. This strategic approach allowed for targeted interventions, including the deployment of specialized fire response teams and classification of high-risk areas for enhanced protection. The results were significant, proving the effectiveness of data-driven wildfire management.

Fire Prevention Measures

To minimize wildfire occurrences, the Kerala Forest Department implements extensive prevention measures in each of the fire seasons. Before the onset of fire season, each forest division prepares a Fire Management Plan, securing approval from the respective circle heads. This approved plan serves as the foundation for the State-Level Crisis Management Plan, which is then submitted to the Ministry of Environment, Forest, and Climate Change for further action.

To combat wildfires effectively, forest divisions implement a range of preventive measures, including clearing fire lines, deploying fire watchers, creating truck paths and constructing sheds. Essential

> Historically, forest fires have not seriously affected Kerala's forest areas, as they tend to burn only the undergrowth and grasslands.

infrastructure, such as vehicles, wireless communication systems, watchtowers, and emergency hotlines, is set up before the fire season begins.

Raising awareness plays a crucial role in wildfire prevention. Various outreach programs like rallies, street plays, film screenings, pamphlet distribution, banners, and advertisements on radio and local TV channels are carried out to educate the public.

Every forest division operates a dedicated Fire Control Room, while a 24/7 State-Level Fire Monitoring Cell functions at the Forest Department headquarters during fire season. Additionally, Crisis Management Teams, comprising volunteers, taxi and auto drivers and other stakeholders, are formed to handle emergency situations. To ensure long-term water availability, reservoirs are constructed and maintained. For real-time wildfire detection and response, forest officials extensively use the Fire Alert System developed by the Forest Survey of India (FSI). This advanced technology helps in timely identification of fire incidents, enabling swift action to mitigate risks.

The impact of these measures has been remarkable. In 2023, the total wildfire-affected area was reduced to just 9.50 hectares, and in 2024, it further came down to 7.70 hectares.

Striving for a 'Zero Fire' Future

The ultimate goal of the Kerala Forest Department is to achieve a "Zero Fire" status. In 2017, only one forest division—Shendurney—achieved this milestone. By 2018, this number increased to three, with Mankulam, Shendurney and Aralam reporting no such incidents. The trend continued in 2019, as Vazhachal, Shendurney and Parambikulam remained unaffected.

In the following years, Mankulam, Shendurney and Munnar Wildlife Division successfully prevented wildfires. By 2020, Vazhachal, Periyar (West) and Parambikulam also remained fire-free. The success continued in 2021, when no wildfires were recorded in Punalur, Konni, Ranni, Marayoor, Vazhachal, Malayattoor, Kasaragod, Aralam and Silent Valley divisions.

The ultimate goal of the Kerala Forest Department is to achieve a "Zero Fire" status.

The year 2022 marked the highest number of wildfire-free forest divisions in Kerala. A total of 16 divisions remained unaffected by wildfires, including

Blaze with Benefits

While wildfires are typically destructive, controlled burns serve valuable purposes such as restoring natural habitats, creating new wildlife cover, reducing fuel in fire-prone areas, promoting tree regeneration, managing pests and diseases, and controlling invasive weeds.

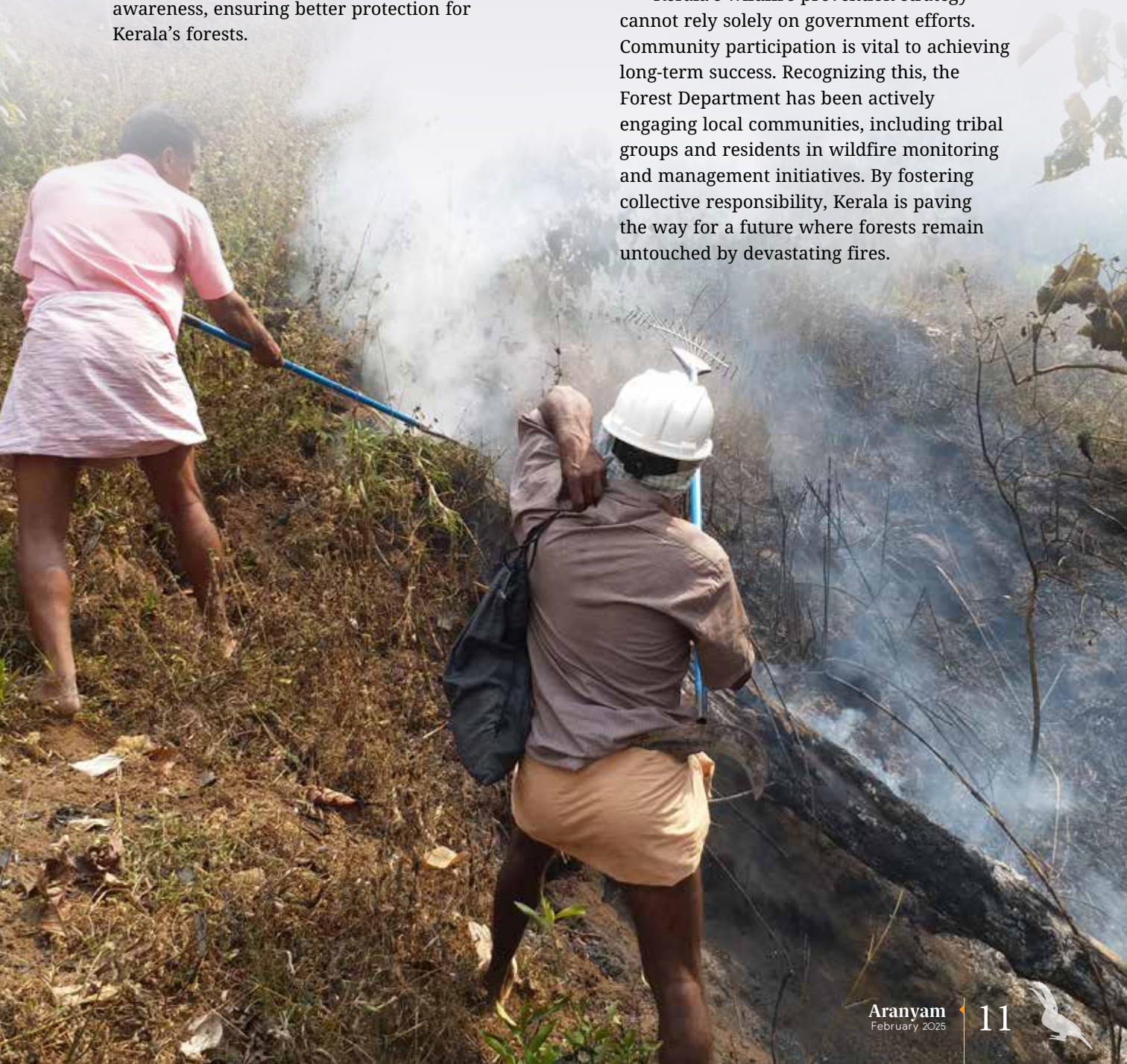
Achankovil, Thenmala, Konni, Ranni, Marayoor, Kannur, Kozhikode, Kasaragod, Thiruvananthapuram (Wildlife), Periyar (East), Periyar (West), Idukki, Munnar (Wildlife), Aralam, Peechi and Parambikulam. In 2023, Parambikulam alone achieved a complete wildfire-free status. By 2024, Achankovil, Vazhachal, Kannur, and Kasaragod divisions successfully remained unaffected by wildfires.

This consistent progress reflects the strengthening of fire prevention measures, improved crisis management and heightened awareness, ensuring better protection for Kerala's forests.

Role of Controlled Fires in Ecosystem Management

While wildfires are often destructive, controlled burns can play a crucial role in ecosystem restoration. Wildfires are often viewed as purely destructive, but controlled burns play a crucial role in ecological restoration. They help in revitalising natural habitats by clearing old vegetation, promoting growth of new plant species, and controlling pests, diseases, and invasive plant species that threaten biodiversity

Kerala's wildfire prevention strategy cannot rely solely on government efforts. Community participation is vital to achieving long-term success. Recognizing this, the Forest Department has been actively engaging local communities, including tribal groups and residents in wildfire monitoring and management initiatives. By fostering collective responsibility, Kerala is paving the way for a future where forests remain untouched by devastating fires.



Wildfires are a growing global concern, but with meticulous planning, advanced technology, and strong community engagement, Kerala has set a benchmark in wildfire prevention and management. By continuing its commitment to conservation, the state can ensure that its forests remain a thriving sanctuary for biodiversity and a legacy for future generations.

State-Level Fire Plan: A Strategic Approach to Wildfire Prevention

To strengthen wildfire prevention and control, the State-Level Fire Plan for this year has been meticulously developed. The plan prioritizes:

- Assessing and enhancing preparedness to prevent forest fires entirely.
- Coordinating with other departments to ensure an efficient disaster response.
- Evaluating and refining strategies post-fire season to implement necessary improvements.

A State Forest Fire Crisis Management Cell has been established to oversee these efforts. The Principal Chief Conservator of Forests & Head of Forest Force serves as the Chairman, with the Additional Principal Chief Conservator of Forests (Forest, Land & Resources) acting as Convener. ▪

Major Causes of Wildfires in Kerala

Wildfires in Kerala arise from a complex interplay of environmental and human-induced factors. Understanding these causes is crucial for effective prevention and control.

- Rising atmospheric temperature.
- Dried grasslands turn into highly flammable fuel during peak summer.
- Prolonged dry spells due to decreasing rainy days
- Absence of summer showers (April-May).
- Expanding human settlements near forests.
- Intentional burning of forest patches to deter wild animals.
- Deliberate fires set to protect agricultural land from wildfire encroachment.
- Controlled burns used to create fresh grazing areas for livestock.
- Traditional use of ash to enhance soil fertility in farmlands near forests.
- Clearing undergrowth through fire to facilitate resource collection.
- Negligence by travelers and locals, leading to accidental fires.
- Religious rituals involving fire in forested regions.
- Scarce water sources within forests hamper firefighting efforts.
- Lack of roads makes accessing fire-prone zones difficult.
- Insufficient preventive controlled burning in high-risk areas.
- Absence of advanced weather monitoring for early fire detection.
- Delayed identification and response to fire outbreaks.
- Continued reliance on traditional methods like fire lines and manual patrolling.
- Limited adoption of modern fire monitoring and prevention technology.

Dr. P. Indira Devi
ICAR Emeritus Professor,
Kerala Agriculture University

When Forest catches Fire.....

Wildfires have long been woven into history and mythology, from Damayanti's ordeal in the flames to Lord Krishna's act of saving wild animals. When Damayanti's story says that wildfires occur naturally, Lord Krishna's story says the other way. While some fires occur naturally, human activities and climate change are increasingly fueling their intensity, turning them into a grave threat to ecosystems and communities worldwide.

The scale of wildfire destruction has surged alarmingly over the years. In 2015, wildfires consumed 98 million hectares of forests, which is almost three per cent of the world's forest cover. However, nearly four per cent of tropical forest areas have been affected by wildfires. By 2021-22, this number soared to 126 million hectares. Some of the worst-hit regions include California, Australia, the Amazon, and some parts of Asia, Africa and Europe. From 2001 to 2022, Russia and Canada recorded the highest forest losses. The year 2024 witnessed staggering destruction—Brazil lost 30.84 million hectares to wildfires, while Indonesia saw 1.16 million hectares go up in flames. The wildfires in South Korea in 2022 and India in 2021 also caused massive devastation.

> According to 2015 figures, 98 million hectares of forest land worldwide were affected by wildfires. This is about 3 percent of the world's forest area.

India has now the best technological advancements for detecting wildfires. However, wildfires remain an ongoing crisis in the country. Between November 2023 and June 2024, blazes ravaged 3,456 square kilometers of forest.

Wildfires claim between 2.6 lakh and six lakh lives annually, and leads to massive biodiversity loss and environmental destruction. Indigenous and tribal communities living in forests face immediate threats, while industries relying on forest resources experience indirect setbacks.

Understanding the Causes of Wildfires

Natural Triggers

- Lightning Strikes: Sudden electric discharges ignite dry vegetation.
- Volcanic Eruptions: Lava flows spark fires in forested areas.
- Extreme Heatwaves: Prolonged high temperatures dry out vegetation, making forests highly flammable.

Human-Induced Causes

Human activities are increasingly contributing to the spread of wildfires. In India's North-Eastern states, the widespread practice of slash and burn agriculture is a serious threat to forests. This method, which involves clearing land by setting fires, has become a major driver of forest degradation and wildfire outbreaks.

Apart from this, Careless disposal of cigarette butts, unattended campfires and reckless behavior of tourists fuel the flames. Careless actions are not the sole cause of wildfires; deliberate arson in forested areas has emerged as a troubling trend. Such reckless acts have catastrophic consequences, not only for nature but also for human communities. As per a report of the WWF, an alarming nine out of ten wildfires in India are traced back to human intervention. While intentional acts play a significant role, wildfires can also ignite unintentionally. Malfunctioning electrical lines, faulty machinery and neglected infrastructure near forested regions have, on rare occasions, sparked devastating blazes.

Role of Climate Change in Wildfires

Climate change acts as a catalyst, intensifying wildfire risks. Rising global temperatures, prolonged droughts and strong winds create the perfect conditions for wildfires to spread uncontrollably.

Strategies for Wildfire Prevention and Control

When forests catch fire, even low-intensity wildfires can inflict significant damage, underscoring the urgent need for preventive measures to curb destruction. A well-planned approach that integrates multiple strategies is essential to safeguard forests and ensure their long-term recovery.

Technological Innovations

- Risk-Based Forest Classification: Mapping high-risk zones and implementing proactive fire prevention measures.
- Advanced Monitoring: Utilizing drones, satellites and AI-powered surveillance for early fire detection and rapid response.

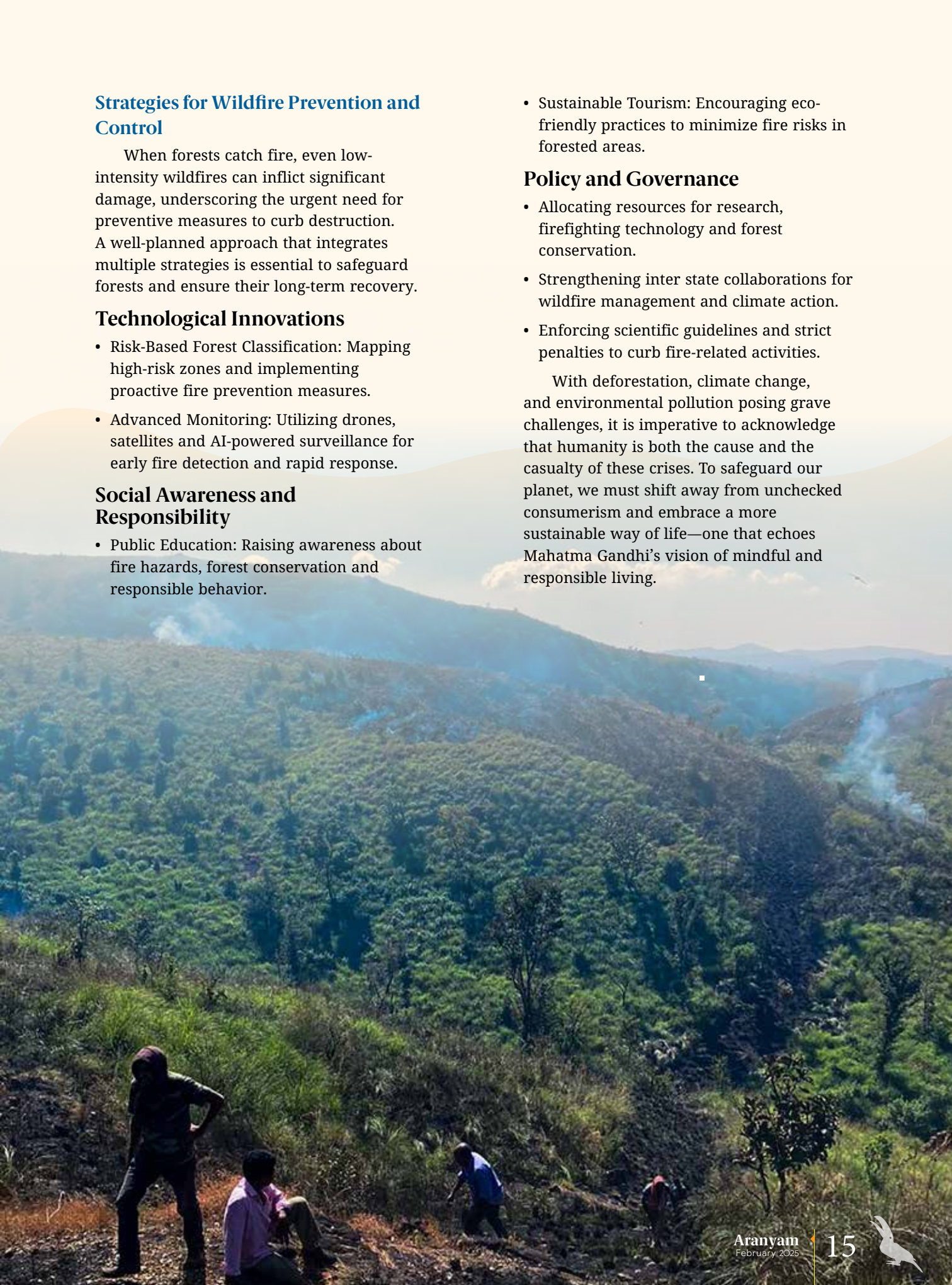
Social Awareness and Responsibility

- Public Education: Raising awareness about fire hazards, forest conservation and responsible behavior.
- Sustainable Tourism: Encouraging eco-friendly practices to minimize fire risks in forested areas.

Policy and Governance

- Allocating resources for research, firefighting technology and forest conservation.
- Strengthening inter state collaborations for wildfire management and climate action.
- Enforcing scientific guidelines and strict penalties to curb fire-related activities.

With deforestation, climate change, and environmental pollution posing grave challenges, it is imperative to acknowledge that humanity is both the cause and the casualty of these crises. To safeguard our planet, we must shift away from unchecked consumerism and embrace a more sustainable way of life—one that echoes Mahatma Gandhi's vision of mindful and responsible living.



Muhammed Anvar
Assistant Forest Conservator

Preserving forests is not merely about conserving nature—it is a battle for survival. The very essentials of life -- oxygen and water-- depend on the health of forests. While food, shelter and clothing are universally recognized as necessities, air and water are so fundamental that they defy categorization. This underscores the irreplaceable role of forests in sustaining life on Earth.

One of the most critical aspects of forest protection is the prevention and control of wildfires. These fires can be triggered by both natural and human-induced causes. In some regions, lightning strikes and friction between dry bamboo stems ignite wildfires. However, in Kerala, the reality is stark—wildfires are entirely human-driven. Negligence, personal vendettas or sheer recklessness are the primary culprits behind these devastating blazes.

Forests and Water Security: An Interwoven Relationship

When rain falls in the forest, the towering canopy of trees acts as a natural shield, intercepting the droplets and slowing their descent. As the raindrops break apart, they gently reach the ground, where a thick, sponge-like humus layer (formed over decades by decomposed leaves and branches) absorbs them. This intricate process allows the soil to retain moisture, gradually releasing it as underground springs that feed rivers and streams. This cycle is vital for ensuring water security for both humans and wildlife across the western regions of the Western Ghats.

Kerala's 44 rivers originate from these lush forests, making them indispensable for sustaining life. This natural reservoir ensures a steady water supply even during the dry summer months, highlighting the irreplaceable role of forests in maintaining the state's water resources. Preserving these ecosystems is not just an environmental priority—but a necessity for survival.

Wildfires wreak havoc far beyond the visible flames. One of the most devastating consequences is the destruction of the humus layer (an organic-rich soil layer that takes years to form). Once this protective cover is lost, the topsoil is left exposed and vulnerable. In forests with reduced leaf litter, raindrops strike the bare earth directly, dislodging soil particles and triggering erosion. The loosened soil washes away with the rain, preventing water from seeping into the ground and replenishing underground springs. This disrupts the delicate water cycle, gradually diminishing natural water sources. The impact extends beyond wildlife; it affects millions of people who are liable to face an increasing threat of water security. As forests

> Extinguishing forest fires is a very dangerous endeavor. Therefore, the practical solution is to be careful not to start a forest fire.

Protecting Forests: A Fight for Life Itself

burn, life-giving resources vanish, leaving both nature and humanity at risk.

Wild animals

Wildfires don't just consume rare plant species, but they also wipe out entire populations of ecologically sensitive animals. Many species are uniquely adapted to specific habitats, making them especially vulnerable to the flames. In such delicate ecosystems, a single wildfire can cause irreversible damage, permanently wiping out species that have taken centuries to evolve. When these fires engulf the rare flora and fauna, they don't merely alter the landscape but unravel the intricate web of life that sustains biodiversity. Unchecked wildfires are more than just a fleeting catastrophe; they accelerate biodiversity loss, disrupting ecosystems and threatening the delicate balance of nature itself.

Wildfire season coincides with the breeding season of many birds, reptiles and mammals. It is a time when the forest is teeming with fragile new life. But when fire sweeps through, escape is impossible for these vulnerable creatures. Small animals and newborns stand little chance against the flames. Mothers, desperate to protect their young, often meet a tragic fate. There are heart-wrenching sights—birds circling their burning nests, unable to save their chicks before finally succumbing to the fire. Reptiles, half-burned, writhe in agony, unable to crawl away from the scorching ground. For these innocent beings, the fire is not a natural disaster—it is often the result of human recklessness. While they mourn their losses, they remain unaware that their suffering might be the outcome of a careless act, a thoughtless spark. If they did understand, would they not wonder why the ones responsible never share their fate?

Once a wildfire ignites, putting it out is no simple task. Fighting flames in the scorching heat and unpredictable winds can be life-threatening. Many have lost their lives trying to control a blaze without knowing which way it would turn. The fire safety measures used in towns and cities simply do not work in dense forests, where conditions are vastly different. This is why forest rangers often attempt to extinguish wildfires at night. But even then, their mission is fraught with danger—thick smoke, thorns and the unpredictable rush of fleeing animals. Every step in the darkness is a gamble. The truth is, preventing wildfires is far more practical than trying to control them.

Protecting forests from fire is not just the responsibility of the personnel from the forest department or the dependent communities. The survival of the Western Ghats directly impacts the water security of millions living along the Arabian Sea coast. This makes wildfire prevention a collective duty, where conservation groups, local communities and the people of Kerala must work together.

Forests were humanity's first home. They are the lungs that give us air, the roots that hold our water. Let them thrive—untouched and unharmed. ▪

Future of Wildfire Management:

Technological Advancement

Dr. Sreejith K. A.
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Wildfires are becoming more frequent and intense, posing severe threats to ecosystems, wildlife and human settlements. Climate change, human activities and natural factors all contribute to their increasing frequency and intensity. If left unchecked, wildfires can lead to massive destruction, endangering ecosystems and causing severe environmental damage. This is why early detection and rapid response are essential. Today, cutting-edge technologies like satellite monitoring, artificial intelligence and drone surveillance are revolutionizing wildfire management. These advancements are improving prediction, monitoring and suppression efforts, helping to safeguard both nature and human communities from the devastating impact of wildfires.

Innovations in infrared imaging, machine learning and the Internet of Things (IoT) are revolutionizing how we detect and monitor these blazes. By combining these powerful tools, experts can now track fire intensity and movement in real time, allowing for faster response times. The result? Quicker containment, reduced destruction and potentially saved lives. With wildfires

growing more intense due to climate change, these high-tech solutions are more than just innovations—they're necessities.

Space age technology

Wildfire detection has taken a giant leap forward, thanks to space-age technology. Satellites equipped with thermal sensors and optical cameras are now crucial players in spotting fires before they spiral out of control. These high-tech systems detect heat signatures and smoke plumes from space, offering a bird's-eye view that allows for early intervention and precise fire management. Global monitoring programs like NASA's MODIS and VIIRS track wildfire activity across continents, providing real-time data to emergency responders. Meanwhile, in India, the Indian Space Research Organisation (ISRO) leverages satellites such as INSAT-3D and Resourcesat-2 to keep a vigilant watch, ensuring that potential threats are tackled swiftly.

Sensor Networks

Deep within the forests, an invisible network of high-tech sensors stands guard, constantly scanning for the first signs of fire. These cutting-edge devices monitor temperature, humidity, and smoke levels, transmitting real-time data to a central system—enabling authorities to respond before flames spiral out of control.

Among the most advanced early detection systems are Fire Watch and India's Forest Fire Alert System (FAST). Fire Watch relies on high-resolution optical sensors to spot smoke and fire outbreaks, while FAST taps into hotspot data from MODIS and VIIRS sensors to generate instant alerts for forest departments.

Drones and UAVs

Drones and Unmanned Aerial Vehicles (UAVs) equipped with thermal cameras and gas sensors are transforming wildfire detection, especially in remote and inaccessible areas. Drones played a crucial role in wildfire incidents such as the Florida wildfires, the 2018 Kolukkumalai fire, and the 2020 Australian bushfires. They were used for monitoring fire fronts, assessing damage and assisting in evacuation planning.

> We have made significant progress in the technology for detecting wildfires with the integration of systems based on infrared imaging, machine learning, and IoT (Internet of Things).

Geospatial Technology

Systems like Geographic Information Systems (GIS) help authorities map affected areas, track fire spread and develop smarter response strategies. By combining data from satellites, drones and ground sensors, geospatial tools generate detailed fire maps that enhance decision-making. With cutting-edge advancements, real-time wildfire monitoring is now possible even in the most remote regions, ensuring faster intervention and more effective disaster management.

Artificial Intelligence

By analyzing real-time data, identifying patterns and forecasting fire behavior, Artificial Intelligence (AI) is making wildfire management more efficient and proactive. Google's Fire Map AI uses machine learning to detect and predict wildfires, pinpoint fire boundaries and suggest evacuation routes. Meanwhile, WIFIRE, developed by the University of California, San Diego, integrates data from satellites, weather stations, cameras and ground sensors to model and forecast wildfires in real time.

Remote Sensing

Using satellites, drones and aircraft equipped with thermal and optical sensors, experts can now track fire location, intensity and spread in real time which ensures faster, more strategic responses.

Infrared imaging, when integrated with IoT-based architecture, enhances wildfire monitoring and control, while cutting-edge machine vision and deep reinforcement learning are powering automated firefighting drones.

Aerial fire fighting

Aerial fire fighting enhances fire suppression capabilities, water delivery capacity, fire retardants, personnel, air surveillance, ground crews and support firefighting operations. Aircraft and helicopters play a primary role in controlling fires.

Firebreaks

Firebreaks are crucial barriers designed to halt the spread of wildfire. They can be either natural or man-made, serving as gaps in vegetation or physical structures that disrupt the movement of flames.

In areas vulnerable to wildfires, controlled burns and strategically placed firebreaks are used to reduce available fuel and effectively preventing the fire from advancing. These techniques are particularly valuable in regions where containing fires quickly is essential for safety and land preservation.

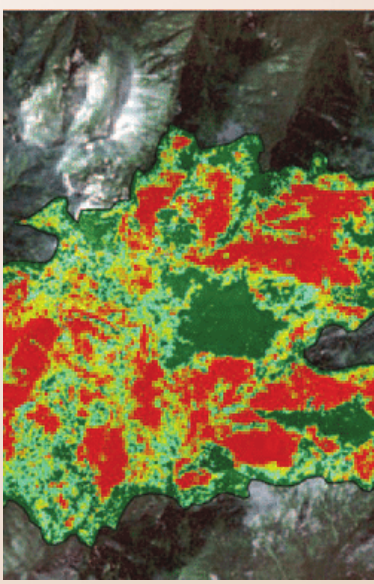
Robotics and autonomous systems

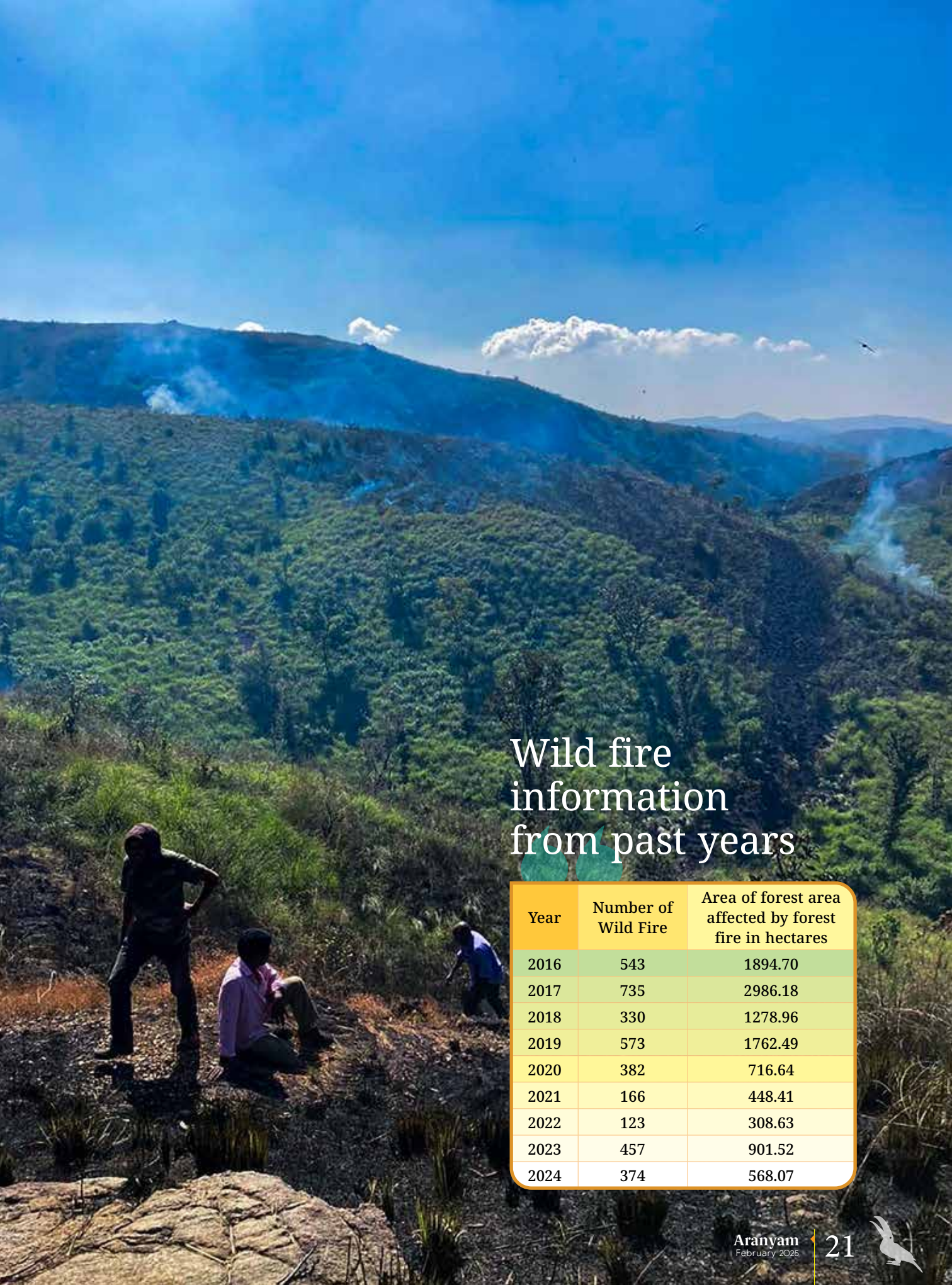
Robotics and autonomous systems have emerged as essential assets in modern firefighting, particularly in high-risk areas where human intervention may be perilous or unfeasible. These advanced technologies ranging from robots to drones are increasingly deployed to fight fires, suppress flames and monitor affected zones.

Systems like Thermite RS3 robot and specialized fire management drones are revolutionizing disaster response. By minimizing risks to human life and improving operational safety, these innovations allow for more precise and rapid firefighting in challenging environments, such as dense forests or urban settings. Their ability to access hard-to-reach areas ensures quicker and more efficient responses to fires. ▪









Wild fire information from past years

Year	Number of Wild Fire	Area of forest area affected by forest fire in hectares
2016	543	1894.70
2017	735	2986.18
2018	330	1278.96
2019	573	1762.49
2020	382	716.64
2021	166	448.41
2022	123	308.63
2023	457	901.52
2024	374	568.07

Bracken Ferns

Nature's Fire Indicators

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Ferns are a group of plants with a life cycle unlike any other. Unlike most plant species, they undergo two independent phases—sporophytic and gametophytic. Water plays a crucial role in their reproduction and water is an essential element for their survival. Ferns are believed to be on earth for 500 million years and they are among the most ancient plant groups on Earth. Their evolutionary significance is underscored by their remarkable genetic complexity. They are known to hold the record for the highest number of chromosomes and the largest known plant genome.

India boasts a wide diversity of ferns, with over 1,200 species thriving across the country. The Western Ghats alone are home to more than 300 species. Among them, ferns from the Pteridium genus stand out as natural indicators of fire.

Bracken ferns, members of the Pteridium genus, are among the most invasive plant species because of their ability to spread. In the biodiversity-rich Western Ghats, Pteridium revolutum stands out as the predominant species. Bracken ferns are believed to have originated about 23.8 million years ago, long before human influence reshaped natural ecosystems. In ancient times, these resilient ferns thrived primarily in open woodlands. However, human activities—both direct and indirect—that fuels forest fires, land mismanagement and environmental disturbances have created ideal conditions for their spread.

Invaders

Bracken ferns are wide invaders, thriving in open forests, grasslands and along forest edges. Their underground stems spread extensively under the ground, which enables

them to survive and regenerate even after significant disturbances. With each wildfire, fresh shoots emerge rapidly, while their underground network accelerates growth. Raising like phoenix, bracken ferns rise stronger after each wildfire. Some studies suggest that climate change and rising temperatures also help in their spread, which makes the spread increasingly challenging.

Bracken ferns are known to hinder the growth of trees and other plants in the grass lands and this is attributed to a biochemical produced by these ferns. By inhibiting the survival, reproduction and spread of native plant species, bracken ferns create a challenging environment for biodiversity. As such, controlling bracken ferns becomes essential for preserving forests and maintaining ecological balance.

Controlling the spread of bracken ferns requires strategic intervention. One effective approach is reintroducing fast-growing native trees in affected areas. By creating dense canopies, these trees reduce sunlight, which limits the ferns' growth and expansion. Another method is through introducing natural predators. Some studies suggest that certain mites may be effective in curbing their spread.

Management of wildfire

Pteridium revolutum stands out as a remarkably resilient fern. Densely seen in fire-prone regions, it flourishes in disturbed landscapes and areas after a wildfire. This species is adapted to survive and rebound after fires, offering valuable insights into fire ecology, landscape recovery and forest regeneration.

One of the most remarkable traits of Pteridium revolutum is its ability to regenerate at a fast pace after wildfires. While intense heat destroys most vegetation, this resilient fern endures by relying on its underground rhizomes, which remain insulated from the flames. Once the fire subsides, fresh shoots emerge swiftly, allowing it to reclaim burned landscapes with ease. Adding to the advantage, Pteridium revolutum produces an abundance of spores that are carried by the wind, enabling it to establish new colonies far beyond the fire's reach.

As a fire-indicating fern, Pteridium revolutum plays a vital role in forest fire management. Land managers and researchers can identify recent fire occurrences by looking at the rapid resurgence of this fern after a wildfire. The presence of this fern in a particular area offers valuable clues about wildfire history, enabling experts to track fire events, assess their frequency and gauge intensity. This information is especially crucial for developing fire prevention strategies and enhancing real-time fire monitoring, particularly in remote or inaccessible regions.

Tracking the growth of Pteridium revolutum provides fire management teams with crucial insights into wildfire patterns and the lasting impact of past fires. By mapping its presence, experts can identify high-risk zones, assess fire-prone landscapes and develop long-term strategies for forest health and resilience. ▪

Kerala's Wetlands

Nature's Biodiversity Reserve

Dr. S. Girija Kumari
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Blessed with an abundance of water bodies and covered in greenery, it is no surprise that land of Kerala rightfully earns its title as God's Own Country—a pride for every Malayali. Nestled between Arabian Sea and Western Ghats, Kerala with its 14 districts stretches over 38,916 square kilometers. The state with 44 rivers carving their way through the length and breadth of the state, branching into countless tributaries and shimmering estuaries, bestow an unrivaled richness. These rivers, lagoons, reservoirs, ponds, wetlands, coastal areas, lakes, and backwaters form an extensive and interconnected ecosystem. This vast network not only enhances the region's natural beauty but also plays a crucial role in maintaining water availability and ecological balance.

Officially defined at the historic Ramsar Convention in Iran in 1971, wetlands encompass all water-rich landscapes—both natural and man-made. Spanning about six per cent of the Earth's surface, these ecosystems are nature's own reservoirs. In India, wetlands stretch across an estimated 15 million hectares, which makes up to 18.4% of the country's total land area. As per records, Kerala has about 1,60,590 hectares of water bodies. They are home to

Photo:
Reji Chandran

an astonishing array of life—300 species of plants, 147 types of phytoplankton, 27 species of mangroves, 160 varieties of fish, and 225 species of birds, including rare migratory visitors. Beyond this, the wetlands also form the backbone of countless livelihoods, supporting agriculture, fisheries, and tourism. As of November 2024, India has 85 Ramsar sites, internationally acclaimed for their environmental significance. Among them, Kerala is blessed with three—Ashtamudi Lake, Vembanad Lake and Sasthamcotta Freshwater Lake.

> Increasing urbanization, consumerism, and the pursuit of luxury are the main causes of watershed depletion.

Challenges

Wetlands are among the Earth's most vital and irreplaceable ecosystems. However, they are vanishing at an alarming pace. Once thriving, these life-giving landscapes in Kerala are now steadily fading, their waters receding under the weight of human ambition. In 1990, wetlands stretched across 2,34,908 hectares. But By 2011, this had shrunk to just 1,60,590 hectares. The real reason behind this rapid depletion are several including unchecked urbananisation, relentless consumerism, and an ever-growing appetite for luxury. Industrial expansion, haphazard development, and reckless conversion of wetlands for construction have further ravaged these delicate ecosystems. With traditional paddy fields giving way to commercial crops, the fabric of wetlands has altered much. One thing that has to be noted is that real estate sector is having the biggest blow on wetlands. In North Malabar alone, a staggering 3,750 hectares of lush mangrove forests have been wiped out due to encroachment. Meanwhile, in the Vembanad Lake region, pokkalI farming—an ancient wetland-based rice cultivation—has suffered a decline, with its expanse dwindling from 10,117 hectares in the past to a mere 2,023 hectares by 2000. The reality is that both small and large water ecosystems are under constant threat. Pollution, climate change, deforestation, and unregulated human activities are depleting these vital resources. Encroachments, industrial waste, and excessive water extraction further accelerate their degradation.

In the 14 districts, four have expansive wetlands. Leading the list is Alappuzha, a district known for its backwaters and home to the iconic Vembanad Lake. Spanning an impressive 26,079 hectares, its wetlands form the very heartbeat of the region. Close behind is Ernakulam with 25,655 hectares. Kollam comes in third place with 13,703 hectares of wetlands. Thrissur holds the fourth place with 13,285 hectares of water-rich terrain. Wayanad having 3,866 hectares of wetlands comes last in the list.

For years, wetlands have been dismissed as mere wastelands and people only see them as fit for reclamation and development.

Though awareness campaigns have shed light on their ecological significance, ignorance and negligence continue to take a heavy toll.

Wetlands are nature's silent protectors, enfolding biodiversity, regulating water cycles and acting as a buffer against floods and droughts. They are often called the kidneys of the Earth, filtering pollutants, replenishing water sources and nurturing a vast web of life. Without these natural purifiers, our planet and human existence itself would be unimaginable. As plastic accumulates, it not only degrades these vital landscapes but also accelerates biodiversity loss, disrupting the intricate balance that sustains countless species.

Protection

It is good to see that we have begun to acknowledge the need for nature-friendly development and that true progress depends on sustained actions. Only through unwavering commitment and collective effort can we protect our wetlands.

Beyond geographical boundaries, it is hard time that we protect the nature's delicate equilibrium as it is fundamental to environmental stability. Recognizing the invaluable role of wetlands, marshes, and mangrove forests, the Ministry of Environment and Forests took a pioneering step in 1968 by establishing a national committee dedicated to its conservation. This committee plays a big role in shaping policies, advising the government on wetland protection and promoting its sustainable management. Under its guidance, two key programs—the National Lake Conservation Program and the National River Conservation Program—work tirelessly to safeguard India's water bodies.

Kerala made history as the first Indian state to enact a law exclusively for the conservation of paddy fields and wetlands. This landmark legislation came into force on December 4, 2008, marking a revolutionary moment in the state's commitment to safeguarding its natural heritage. Designed to protect Kerala's fragile wetlands and fertile paddy fields, the law serves as a bulwark against unregulated land conversion and reckless development. It curtails indiscriminate excavation and prevents rampant filling of agricultural lands.

Wetlands are unique eco systems that combines land and water, forming one of the most biologically rich ecosystems on Earth. From microscopic organisms and amphibians to reptiles, mammals, and birds, these ecosystems serve as sanctuaries for breeding, nesting, and feeding, offering refuge from predators and ensuring the survival of countless species. Beyond this, wetlands act as nature's reservoirs, regulating floods by absorbing excess water and gradually releasing it to prevent disasters. They also provide a haven for migratory birds, offering abundant food and safe resting grounds on their long journeys. Given their immense ecological value, effective laws and regulations must be enforced to ensure their protection for future generations.

Revival

Public involvement is crucial for wetland protection. It has always been a driving force behind successful environmental conservation. One of the most striking examples is the protest by fishermen against construction of resort along the shores of Vembanad Lake. Their unwavering resistance not only protected the lake's fragile ecosystem but also underscored the power of collective action in safeguarding nature. Various wetland restoration projects, environmental organizations, and activists collaborate with government agencies to protect these invaluable ecosystems, which is promising. Among them, the late Kallen Pokkudan remains a symbol of dedication—his lifelong mission to restore mangrove forests continues to inspire generations. The impact of environmental activism is evident in major victories such as the stalled Aranmula Airport project, Kezhattoor Bypass and Kandankolly Petroleum Storage Terminal. Yet, despite these successes, infrastructure development, including road and railway expansions, remains a threat to

wetlands. Another pressing environmental challenge is the reckless destruction of inland hills. Excessive excavation and unregulated land removal strip away fertile soil and accelerate the loss of critical water sources.

Environmental protection should be a top priority of every citizen. Recognizing the irreplaceable value of wetlands, India enacted the 2017 Wetland Conservation Act, under which the National Wetland Committee oversees the preservation and management of these ecosystems. In Kerala, the State Wetland Authority of Kerala (SWAK) leads the effort. Apart from formulating guidelines and strategies for the preservation of wetlands, SWAK also strives to educate the public about the importance of these water-rich landscapes and their role in ecological stability.

As per the 1971 Ramsar Convention, the world observes February 2 as the World Wetlands Day.

Strengthening Wetland Protection Laws

One of the biggest challenges in wetland conservation is the exploitation of loopholes in the existing laws. A major issue lies in the narrow definition of wetlands. Several of the ecologically significant wetlands fall outside this classification, leaving them without any legal protection. Apart from this, conservation efforts mainly focus on wetlands under government jurisdiction. The 2017 Wetland Conservation Act fails to fully protect wetlands located within wildlife sanctuaries, forests, and coastal zones. Without clear legal safeguards, these wetlands continue to face unchecked destruction.

When wetland conservation focuses mainly large and well-known ecosystems, smaller wetlands get vanished unnoticed. Addressing this challenge requires a data-driven and inclusive approach. Every wetland—regardless of size must be mapped, monitored, and legally safeguarded. The urgency of the situation also calls for stronger legislation that extends protection beyond prominent wetlands, covering even the smallest but ecologically vital water bodies. ▪

Photos:
Reji Chandran

Wetland Conservation

Kerala's SWAK Initiative

Suneel Pamidi IFS
Member secretary SWAK

Dr. John C. Mathew
Environment programme Manager, SWAK

The Wetland (Conservation and Management) Rules, 2017 stands as a milestone in India's environmental policy, ensuring protection of the wetlands. Based on this, the State Wetland Authority of Kerala (SWAK) was established in 2017 to oversee the conservation and sustainable management of wetlands across Kerala.

Environment Minister (at present the Chief Minister) is the chairperson of SWAK. Chief Secretary of the state acts as the Vice-Chairperson while the Director of Environment and Climate Change Department serves as the Member Secretary. The other members include secretaries from various departments and subject experts in five key areas: Wetland Ecology, Wetland Hydrology, Wetland Fisheries, Landscape Planning and Socio-Economics.

SWAK is the nodal statutory authority for all designated wetland authorities within the state. It facilitates coordination by implementing integrated management plans through various line departments. The authority issues necessary guidelines to respective implementing agencies for the

conservation and sustainable management of wetlands. Additionally, SWAK undertakes measures to raise awareness among stakeholders and local communities about the importance of wetland conservation.

Powers and Responsibilities

- SWAK is entrusted with identification and classification of wetlands that require protection under the Wetland (Conservation and Management) Rules, 2017.
- Based on scientific documentation and ecological assessments, SWAK recommends the inclusion or exclusion of wetlands in the official list for regulation and notification.
- SWAK maintains a comprehensive digital inventory of Kerala's wetlands
- SWAK formulates guidelines to specify which activities should be restricted, permitted, or regulated within notified wetlands
- The authority develops and periodically reviews integrated management plans for notified wetlands, including Ramsar sites
- SWAK is responsible for strict enforcement of the Wetland (Conservation and Management) Rules, 2017

Major Activities of 2023-24 by SWAK

SWAK initiated the process of adding four more wetlands to the Ramsar list. As part of the initiative, draft Ramsar Information Sheets (RIS) for Akkulam-Veli, Vellayani Lake, Kottuli , Kattampally-Valapattanam-Kuppam Wetland was completed. The draft has been approved by the technical committee.

A dedicated web portal and mobile application was developed to register and engage 'Wetland Mitras'—volunteers contributing to wetland conservation.

Soil survey and conservation efforts were launched at three Ramsar wetlands in collaboration with the Department of Soil Conservation.

The bird censuses in three Ramsar sites allotted to Kerala Agricultural University was held and has been made available in the Wetland Inventory Assessment & Monitoring System (WIAMS) web portal.

Instructions were given to Local self-government bodies to prevent waste disposal. ▪

Majestic Tigers of Sundarbans: Rulers of the Mangroves

The Sundarbans is the largest mangrove forest in the world, located at the confluence of the Ganges, Brahmaputra, and Meghna rivers. This vast ecosystem, shared by India and Bangladesh, comprises dense mangrove forests, mudflats, intricate waterways and scattered islands.

In India, the Sundarbans spans about 4,200 square kilometers, primarily within the North and South 24 Parganas districts of West Bengal. Of the 102 islands in Sundarbans, 48 are covered in dense forests, serving as a sanctuary for biodiversity. They act as a crucial ecological buffer, protecting the Bay of Bengal coastline from cyclones, rising sea levels, and extreme weather events.

The name “Sundarbans” comes from Bengali language, meaning “beautiful forest.” However, many believe the name originates from the Sundari tree (Heritiera fomes), a dominant mangrove species in the region. Unlike any other mangrove forest in India, the Sundarbans has numerous unique features. As it boasts extraordinary biodiversity, the Sundarbans support both terrestrial and aquatic life. Due to its ecological significance, it is also considered a Biosphere Reserve.

Sundarbans National Park is home to a large population of Bengal tigers, making it an important tiger conservation center. Due to its unique and ecologically valuable habitat, the Sundarbans is recognized as a UNESCO World Heritage Site. As Sunderbans is internationally important wetland, it was designated as a Ramsar Site on January 30, 2019.

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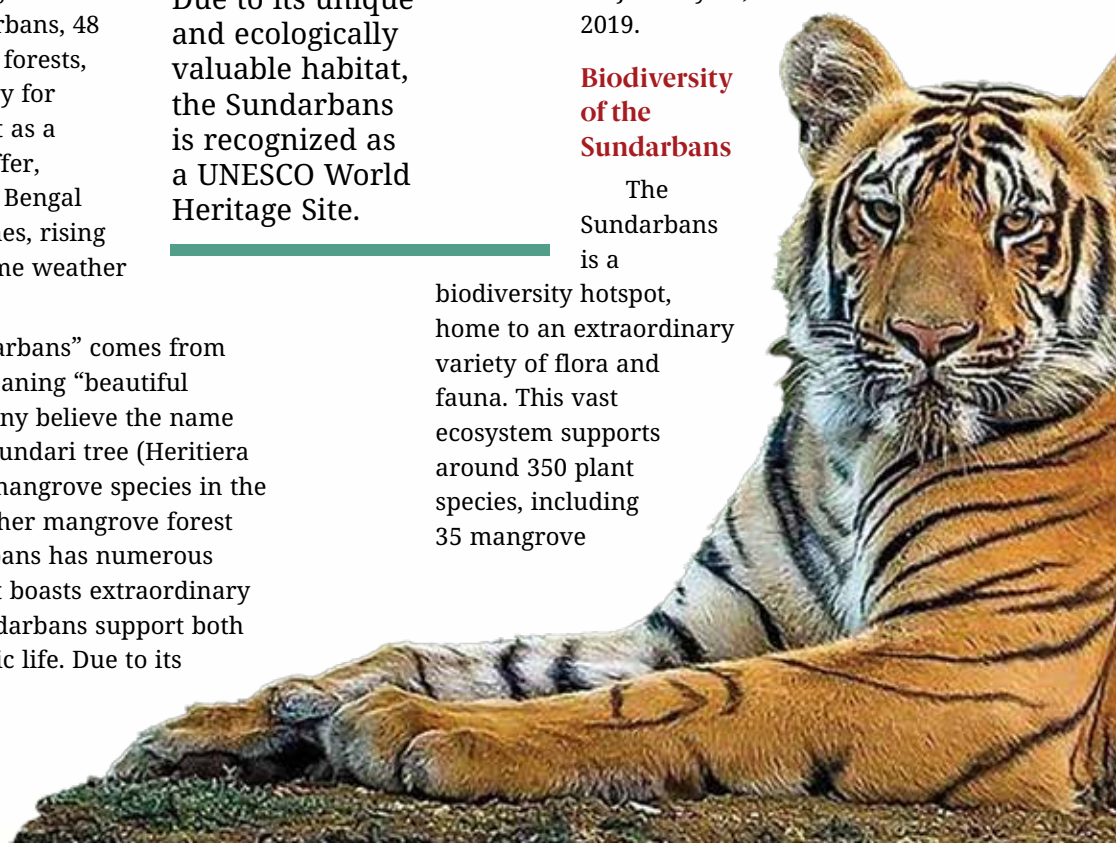
Biodiversity of the Sundarbans

The Sundarbans is a biodiversity hotspot, home to an extraordinary variety of flora and fauna. This vast ecosystem supports around 350 plant species, including 35 mangrove



The Sundarbans is an example of the interrelationships between nature, climate, and human well-being. A journey through the wild beauty of the Sundarbans.

Dr. A. Biju Kumar

Head of the Department of Aquatic Biology & Fisheries,
University of Kerala, Karyavattom, Thiruvananthapuram

species found exclusively in this region. A recent report by the Zoological Survey of India (ZSI) documented 2,626 species from 25 different fauna groups in the Sundarbans. This includes 50 mammal species, including the Royal Bengal Tiger, 356 bird species, 11 turtle species, 13 lizard species, 37 snake species, 10 frog species, 350+ fish species, 173 mollusk species and around 753 insect species. Apart, The Sundarbans also holds several endangered species, including Ganges dolphin, Irrawaddy dolphin, Saltwater crocodile and Horseshoe crab.

Royal Bengal Tigers

Earlier the world had eight subspecies of tigers. However, in the past 100 years, three subspecies have gone extinct due to poaching, habitat destruction, and human-wildlife conflict. Today, only six subspecies of tigers exist, including the Indian Tiger or Royal Bengal Tiger (Panthera tigris tigris), found in India, Nepal, Bhutan, and Bangladesh. Recent genetic studies have led to a simplified classification of tigers into two major groups based on their evolutionary history: Sunda Tigers (Sumatran Tigers, Panthera tigris sondaica) and Continental Tigers (Royal Bengal Tiger-- Panthera tigris tigris)

India is home to the largest population of Royal Bengal Tigers in the world. For centuries, they have been an integral part of India's heritage and folklore, shaping both cultural and ecological narratives. According to the 2022 Tiger Census, the country has a total of 3,167 tigers. Among them, nearly 100 tigers inhabit the Sundarbans.

The Royal Bengal Tigers of the Sundarbans have evolved distinct physical traits to survive in their challenging mangrove habitat. Though genetic studies are yet to confirm significant variations, these tigers display noticeable differences compared to their counterparts in other ecosystems. Compared to other tigers, Sundarban Tigers are smaller and lighter. This reduced body weight helps them move efficiently through the muddy terrain and dense vegetation. Unlike their larger relatives in drier forests, these tigers navigate through mangrove islands, frequently swimming between them to

hunt for food.

Sundarbans lies in an area of about 1,699.62 square kilometers, with an additional 885.27 square kilometers buffer zone. An important aspect is that Sundarbans remain free from human settlement, offering a true wilderness for its majestic predators. The reserve is surrounded by 48 interconnecting islands, forming a complex network of rivers, tidal channels, and mangrove-covered islands. The Sundarbans Tiger Reserve is interwoven with an intricate mesh of countless creeks, channels, rivers, and mangroves. Camera traps have documented 30 tigers in the buffer zone, highlighting their vast presence. These big cats use natural waterways like the Matla River, which serves as an inter-divisional corridor, Raimangal River that acts as an international boundary, for their movement between India and Bangladesh. Sundarbans tigers are remarkable swimmers, frequently crossing 50 to 70-meter-wide channels with ease. Some have even been observed traversing large rivers.

The Sundarbans: A Lifeline for Millions

Sundarbans is not just a biodiversity hotspot. It is also the lifeline of nearly 4.5 million people who inhabit this unique region. Local communities have long depended on the natural resources of the Sundarbans for survival. Their traditional occupations include Fishing, Agriculture, Aquaculture, Honey Collection and Boat-Making. It is estimated that the region has about three lakh fishermen.

Threats

The Sundarbans, one of the most biodiverse ecosystems in the world, is under constant threat from human activities and climate change. Rapid population growth and urbanization have led to large-scale encroachments in the region. Deforestation for agriculture, aquaculture, and infrastructure projects is disturbing the region's delicate ecological balance. Apart from this, industrial activities and unregulated tourism add to the stress on this fragile ecosystem. Unsustainable fishing and honey collection also threaten the Mangroves. Another major concern is pollution from agricultural fields and industrial units. This region is often referred as the "focal point" of such environmental issues in India.

Sundarbans is not just a biodiversity hotspot. It is also the lifeline of nearly 4.5 million people who inhabit this unique region.

The Sundarbans is at the forefront of climate change impacts, often regarded as India's most vulnerable region to global warming. Global warming is accelerating sea level rise, endangering low-lying areas of the Sundarbans. This leads to submergence of vast regions of the mangrove forests. Coastal erosion and increasing salinity are disrupting both biodiversity and human settlements.

Photo:
Soumyajit Nandy

Moreover, the frequency and intensity of cyclones are steadily rising, causing widespread devastation to both ecosystems and human settlements. These storms displace thousands and destroy livelihoods. Another pressing issue is that of seawater intrusion into freshwater systems, which diminishes agricultural productivity and disrupts local water supply. This growing crisis threatens food security and daily life.

Human-tiger conflict

Human-tiger conflict in the Sundarbans remains a major challenge. Most of the villagers rely on the forest for their livelihood, venturing deep into the mangroves for fishing, honey collection, and wood gathering. These activities often lead to encounters with tigers, resulting in tragic consequences. Reports indicate that, on average, 20 people lose their lives to tiger attacks in the Sundarbans each year.

> Tigers exhibit remarkable discipline. They do not attack humans beyond their territory, particularly outside the reserve. However, within their domain, they see no difference between humans and deer.

The people of the Sundarbans are deeply connected to their traditions, which have been shaped by their environment and folklore. One of the most revered legends of the region is that of Bonbibi, the guardian deity believed to protect both the forest and its people. Hindus and Muslims alike worship Bonbibi, trusting that she was sent by divine forces to shield them from Dakshin Rai (tiger), an ominous spirit. Scattered across the Sundarbans, shrines dedicated to Bonbibi serve as sacred sites where villagers pray before entering the mangroves. They seek her blessings for safety from tiger attacks and a secure passage through the dense wilderness.

In the Sundarbans, widows of those killed by tigers—known as Bagh-Bidhoba—endure severe social stigma and isolation. Deep-rooted superstitions label them as cursed, pushing them to the fringes of society. Many are stripped of their social status, financial security, and even family support.

Today, nearly 3,000 such widows live in the Sundarbans, with an entire village solely inhabited by them. Without proper social protection, they struggle to survive, relying on small livelihoods and the assistance of NGOs working to uplift them. Their plight highlights the urgent need for social reform and economic support in these vulnerable communities.

Conservation Strategies

The livelihoods of fishermen, honey collectors, and woodworkers in the Sundarbans depend heavily on forest resources. To mitigate human-wildlife conflict, various conservation strategies have been implemented. Under Project Tiger, armed forest guards patrol key blocks to prevent illegal activities and protect

both humans and wildlife. Electrified clay dummies, designed to resemble local villagers, have been installed in forests to deter tigers. Additionally, villagers working in the forests wear face masks on the back of their heads. This practice aims to prevent tiger attacks, as Sundarbans tigers are known for their stealth, often ambushing prey from behind.

According to Project Tiger Director R.L. Singh, addressing the challenge of man-eating tigers has offered invaluable lessons. He explains, “Tigers exhibit remarkable discipline. They do not attack humans beyond their territory, particularly outside the reserve. However, within their domain, they see no difference between humans and deer.”

Research underscores that integrated forest management and sustainable alternative livelihoods are key to safeguarding both humans and tigers. Strong government policies and active community involvement are essential for maintaining this balance. Raising environmental awareness can also dispel superstitions surrounding tiger attacks, while community-driven eco-cultural programs and mental health support can help widows of those killed in tiger attacks overcome social stigma.

A united effort from local communities, government and global organizations is needed to safeguard the Sundarbans. The success of long-term conservation hinges on active community engagement. Promoting sustainable livelihoods like eco-tourism, organic farming and community-led aquaculture lessens reliance on mangrove resources. These initiatives not only protect the fragile ecosystem but also bolster local economies, ensuring a harmonious balance between conservation and livelihood security. Restoring degraded forest areas in the Sundarbans through planting of native mangrove species is crucial for conservation. These efforts not only boost biodiversity but also fortify the region against climate change threats, including rising sea levels and extreme weather events.

Scientific research and continuous monitoring are essential for understanding the complexities of Sundarbans ecosystem. This can help in detecting emerging threats much early and guide adaptive management strategies to protect this region. As Sundarbans stretch across both India and Bangladesh, addressing challenges such as water pollution, resource depletion and climate resilience requires strengthened cross-border cooperation. International support and collaborative conservation efforts will be key to ensuring the long-term sustainability of this vital ecosystem.

> The Sundarbans is a powerful reminder of the deep connection between nature, climate and human survival. Protecting this fragile ecosystem is both an environmental urgency and a moral duty.

The Sundarbans is a powerful reminder of the deep connection between nature, climate and human survival. Protecting this fragile ecosystem is both an environmental urgency and a moral duty. By preserving Sunderbans, we safeguard a true biodiversity, enhance climate resilience, and secure the livelihoods of millions. In an era of growing environmental uncertainty, the Sundarbans stand as a beacon of hope and a testament to the need for collective action in conservation. ▪

Mangrove Forests

Guardians of Carbon

Study based on mangrove forests in Tirur region

Dr. Vishnu P.S.
Assistant professor, School of Environment Studies,
Thunchathezhuthachan Malayalam University

Muhseena P.
PG Student, School of Environment Studies,
Thuncxhathezhuthachan Malayalam University

Mangroves are among the most important coastal ecosystems, providing ecological stability while acting as natural climate regulators. They act as a crucial link between marine and terrestrial ecosystems. Mangroves absorb and store large amounts of carbon dioxide, making them crucial for climate change mitigation. Unlike other ecosystems, they trap carbon in their biomass and soil for centuries, preventing it from re-entering the atmosphere. Apart from this, Mangroves serve as coastal buffers. Their dense root systems stabilize shorelines, preventing coastal erosion and reducing flood risks.

> Mangrove forests are among the most efficient carbon sinks on the planet. They are capable of storing four times more carbon than terrestrial forests.

Mangrove Forests: Champions of Carbon Sequestration

Mangrove forests are among the most efficient carbon sinks on the planet. They are capable of storing four times more carbon than terrestrial forests. And this is because the soil in mangrove forests is always wet. Mangroves grow in oxygen-poor, waterlogged soil, which slows down organic matter decomposition. This allows carbon to accumulate in sediments

for centuries and prevent it from re-entering the atmosphere. Unlike terrestrial forests, mangroves store carbon both above and below the ground. They store carbon both in their above-ground biomass, such as branches, leaves and trunks, and in their extensive root systems beneath the soil. Protecting and restoring mangrove ecosystems is essential for long-term carbon sequestration, climate resilience and biodiversity conservation, which ultimately lead to safeguarding the planet's future.

Carbon stock refers to the total amount of carbon stored in an ecosystem. This encompasses both living and non-living organic matter. In mangrove forests, carbon is sequestered in multiple areas.

Above the Surface: The leaves and branches actively lock carbon, playing a crucial role in climate regulation.

Beneath the Surface: Mangroves boast of intricate root systems that go deep into the soil, acting as underground carbon reservoirs. These roots store immense amounts of carbon, keeping it safely trapped beneath the earth.

Soil: The slow-moving, stagnant waters of mangrove forests create a natural preservation system. By slowing decomposition, these wetlands accumulate rich organic matter, turning their soil into efficient carbon storage systems.

Carbon Sequestration Mechanisms

Through photosynthesis, Mangroves absorb atmospheric carbon and lock it away in their living tissues and the surrounding soil, thus creating a long-term natural reserve. The waterlogged soil slows down the decomposition of organic matter and thus prevents carbon from escaping into the atmosphere. All these turns the coastal ecosystems into world's most effective carbon sinks. The mangroves have tremendous root systems that trap sediments from rivers and coastal waters. As these trees grow and mature, they absorb even more carbon. As such older mangrove forests become one of the most efficient carbon sinks.

Mangroves in Thirur

With respect to mangrove and carbon sink, let us look at a study on the fragile ecosystem at Thirur. A recent study by the Environmental Studies School at the Thunchath Ezhuthachan Malayalam University has highlighted the crucial role of mangrove forests in this region. These mangroves act as natural nurseries, providing shelter for fish, crabs and a variety of marine species in this region. For generations, they have supported local fishing communities, sustaining livelihoods and preserving age-old traditions. But the significance of mangroves extends beyond marine life. These natural forests form a natural barrier against coastal erosion and protect the shoreline from the harsh waves.

While specific data on carbon storage in Thirur mangrove forests remains scarce, broader research on mangroves in Kerala underscores their role as crucial carbon sinks. Studies conducted in the mangrove forests of Kannur and Kasaragod show that they hold a substantial carbon reserve. Estimates suggest that these forests store between 160 to 300 tons of carbon per hectare.

Pollution

The mangrove forests of Thirur are facing an escalating threat of pollution. Various human activities, particularly those linked to agriculture, are disrupting these fragile ecosystems.

One of the major concern is the pollution from nearby farmlands. Rainwater carries chemical fertilizers, pesticides and herbicides used in the agricultural fields into the mangrove ecosystem. This clearly upsets the delicate balance. The excess nitrogen and

phosphorus trigger eutrophication, a process that depletes oxygen levels and destabilizes aquatic life. This weakens the mangroves' ability to act as efficient carbon sinks.

The unchecked dumping of household and human waste into these ecosystems is severely contaminating water and soil. This augments the growth of harmful bacteria and pathogens. As waste accumulates in the soil, water and plants the efficiency of these Mangrove forests declines. Their ability to function as natural carbon sinks weakens. This ultimately reduces their carbon storage capacity and diminishes their role in climate regulation. Drastic effects of this diminishing capacity can be seen in the deterioration of tree health and also soil and water Contamination.

A recent study comparing polluted and unpolluted mangrove areas in Thirur has shown that carbon stock in polluted mangroves was 15 per cent lower than in pristine areas. This signals a significant decline in their ability to trap and store carbon. This finding underscores the direct impact of contamination on the carbon sequestration capacity of mangroves.

A recent study comparing polluted and unpolluted mangrove areas in Thirur has shown that carbon stock in polluted mangroves was 15 per cent lower than in pristine areas.

Invasive Species

Apart from Human activities, the mangrove forests of Thirur face yet another growing ecological threat. This is from invasive plant species. Among the most aggressive intruders are the Singapore daisy (Sphagneticola trilobata) and water hyacinth (Eichhornia crassipes), which are rapidly altering the delicate balance of these coastal ecosystems. These invasive species alter the balance of local biodiversity and disrupt the functioning of the mangrove ecosystem.

A Path to Conservation

Protecting mangrove forests of Thrissur requires a multi-faceted approach that addresses pollution, habitat degradation and ecological threats. We can only protect these mangroves through effective waste management, sustainable ecotourism, community involvement and restoration.

Establishing efficient waste disposal systems in nearby communities can prevent plastic, household waste and chemical pollutants from contaminating these ecosystems. Unregulated tourism also threatens mangrove habitats. The authorities should limit visitor numbers, enforce strict waste disposal regulations and promote eco-friendly tourism practices.

Urgent and coordinated efforts are needed to safeguard these ecosystems and their vital ecological functions. The long-term protection of Thirur's mangrove forests requires the active participation of local communities, environmental organizations, and government agencies. The authorities should enforce strict pollution control measures. Local environmental groups should play a proactive role in monitoring violations, reporting illegal activities, and raising awareness about conservation. Engaging residents, activists and environmental organizations in addressing waste management issues and restoring degraded mangrove areas will strengthen the resilience of these forests. ▪

▪ Sharing the Insights from Waterfowl Census in Thiruvananthapuram District

Kerala's Wetlands: A Haven for Birds

Anupama R.
People for Planet, WWF India

Wetlands are shallow water bodies where water remains stagnant either permanently or seasonally, creating rich ecosystems that support diverse wildlife. Kerala is known for its abundant wetlands. These wetlands serve as a crucial habitat for numerous bird species. Many resident birds thrive in these ecosystems, while migratory water birds also visit annually, making wetlands an integral part of the state's biodiversity.

Every year in January, birdwatchers and conservationists across Asia come together for the Annual Asian Water Bird Census (AWC). On January 11, Thiruvananthapuram hosted its AWC survey, an event jointly organized by WWF India, Social Forestry Division of Thiruvananthapuram and Wildlife Trust of India. I also got an opportunity to be part of the survey.

In Thiruvananthapuram district, a dedicated team coordinated by Shivakumar from WWF India began the survey from Poovar Beach coastline. As we reached the beach, the soft call of Pied Kingfisher greeted us, setting the tone for a truly captivating experience. Just as we thought of having a closer look, the Pied Kingfisher took flight, their wings beating in unison as they soared away, evading us. In the distance, near the edge of the bay, a group of turns caught our

attention. We kept our eyes fixed on them, hoping they would come near. Then a pair of herring, Heuglins Sea Gull appeared. They glided towards us with their elegant white wings fluttering in the wind. Finally, a group of Mangolian Sanderling and Sanderlings caught our eye. They ran swiftly across the damp sand, nimbly avoiding footprints left by previous visitors. Amid the group, two sanderlings moved carelessly, pecking at the sand in search of food. At intervals, the entire flock of Mangolian Sanderling took flight and landed a bit farther from us. Once settled, the sanderlings resumed their activities, pecking and scurrying across the damp sand. As we counted, we realized there were about forty-four in total, a remarkable sight that underscored the richness of this ecosystem. As we continued our observations, a Little Egret, similar in shape and appearance to the others, appeared on the sand. We took a moment to appreciate the delicate beauty of its presence before it disappeared into the landscape. A short while later, a Reef egret emerged, its distinctive wing beats echoed through the air. As we were waiting for the boat, a Stork Billed Kingfisher perched with poise and confidence was seen in the mangroves. And yet far away on the coconut plam leaves, we saw the Stork-billed kingfisher. Soon after, we could hear the sounds from White breasted Kingfisher.

Our journey continued in a boat slowly through the mouth of the river, the calm water reflecting the soft light of the day. In the midst of the mangroves, the silence was broken by the soft movements of Open Bill Strok. The damp wings of cormorant fluttered softly in the breeze; their movements graced the shoreline. Nearby, cormorant and Indian Cormorant basked lazily in the warmth of the sun. In the distance, two Oriental Darter were seen looking at us anxiously. Meanwhile a cormorant was engrossed in something just beneath the water. As if unbearable of the heat, a Brahminy Kite was having a quite bath. As I turned around, my gaze was drawn to an extraordinary sight of a blue goldfish perched on the branch of a tree. Though we expected to catch a glimpse of the Black Capped Kingfisher, which was seen in the last census, we couldn't trace them this time.

> In yet another reminder of the severity of wetland degradation, this year's Asian Waterfowl Census recorded a 13 percent decline in birds compared to last year.

Mongolian Sandgrouse

After the water bird's census in Thriurvanathapuram district, everyone gathered at the social forestry complex in Vattiyurkkavu. Each team had their own unique stories to tell. Almost all the teams raised concern over the decrease in birds in the district.

The story at Pazhanchira left a lasting impression on everyone. Before the first light of dawn, the team that had arrived at the village was welcomed by a breathtaking sight—a flock of Grey Headed Swamphen, Spot Billed Duck, Painted Stork and Egrets. The survey team revealed that they had quite a surprise when they were trying to identify a Grey Fronted Green Pigeon through a binocular. From the midst of the sky, a Brahminy Kite suddenly emerged and caught hold of a Dove. In the midst, another Brahminy Kite emerged and tried to snatch the prey, which culminated in fierce battle. Despite desperate attempts, the Brahminy Kite that had first caught the prey was successful in retaining its prey. After this shocking event, the team members, with amazement, witnessed another surprising scene. In the distance, they saw about 300 of Whistling Teal and Blue Winged Teal. From

the team, it was known that cattle grazing and some indigenous plants were a threat to Pazhanchira.

The surveying team that visited kadinamkulam also drew the attention, stating that they could not trace regular birds that frequented the region during the census. Though they came across about 70 Eastern Swallow in Kadinamkulam, regular spectators like Dartedr, Kingfisher, Egrets, Open Bill Storks, Whimbrel, Greenshank and Common Redshank were absent here. However, they spotted a group of Open Bill Storks that were engaged on the other side of the river. In the surrounding areas of the village, the survey team noticed increased human activity and ongoing development activities. These changes were gradually disturbing the birds' natural environment, making peaceful observations of avian life in the region increasingly difficult.


Indian cuckoo

In Punchakari, the once vibrant flocks of Lesser Whistling Duck, Egret, White Breasted Water Hen were nowhere to be seen. The numbers of water birds had dwindled significantly, a stark contrast to the lively gatherings that had once graced the place. However, the team spotted the migratory Yellow Wagtail. In Vellayani, an Indian Cuckoo was seen gazing leisurely at the camera. The team members were happy to see Amur Falcon and Roller Bird. Despite the initial excitement of spotting a few birds, a sense of concern soon filled the team as they could not trace the regular visitors like Spoon Bill, Davchick and Water Hen. Moreover, they said it was hard for them to trace more birds in the region as the sounds of small explosions from nearby farming fields deterred the birds. The sharp, sudden noises disrupted the peace, likely forcing the birds to migrate to quieter, undisturbed places. This raised serious concerns about habitat disturbances.

As the team was in Veli Beach, they saw Eastern Swallow birds, which always flew high above the fields. The team counted about 850 of these birds, a remarkable sight against the backdrop of a changing environment. The absence of water birds here was attributed to depletion of oxygen in aquatic ecosystems due to environmental degradation. As the oxygen levels in the water decrease, the population of water-dwelling creatures, which form the primary prey for these birds, steadily diminishes. At the end of the footpath, the team saw Bronze Winged Jacana, Pheasant Tailed Jacana, Grey Heasded Swamphen, Further ahead near the lake, they came across Chestnut Bittern. They also came across about 150 whistling Teal and Yellow Bittern from near the Centre for Earth Science Studies at Akkulam. The threat of invasive plant species and the ongoing impact of pollution are steadily depleting the fragile ecosystem at Akkulam, the census team concluded.

From near Aruvikakra dam, the team traced Ibis, Egrets, Cattle Egret, Red Walted lapwing, Purple Heron and several other birds. Though these sightings highlighted the area's continued significance as a habitat for water birds, the team found that the fencing around the water body for preventing pollution, created a barrier for effective bird observation.

The team that visited Keshavadasapuram also found less number of birds. This time, due to lack of farming in the region, invasive plant species have spread extensively. As a

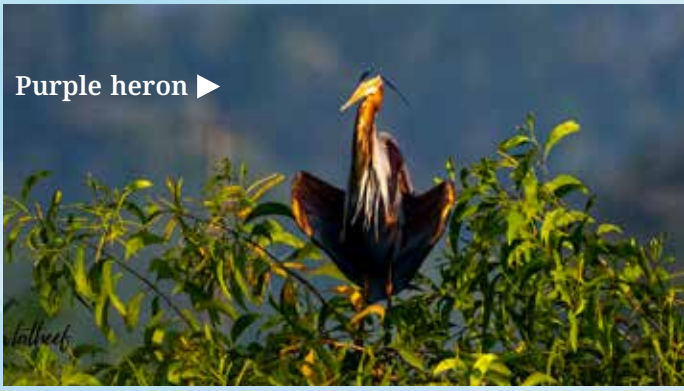
result, it became impossible to spot the usual water birds resting in the shallow waters, a sight commonly seen from here.

Thiruvananthapuram Zoo is another place where one can come across a variety of birds. However, this time, the team that visited the zoo premises could only see a drastic decrease in the number of birds in the ponds. In the abundant fertile paddy fields of Nedumkadu, the team saw Common Sandpiper, Ibis, Spotted Sandpiper and several Egrets. The visiting team saw that development of Papannamkodu railway line was the reason for witnessing a lesser number of birds in the region.

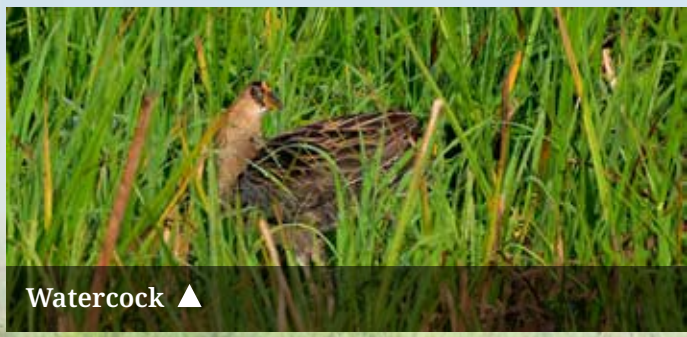
The team that visited Kannanmoola Canal, which is now filed with invasive plant species, saw only one Asian Wooly Necked Stork and some White Breasted Waterhen. They also could not see the regular Yellow Bittern which frequent the region.

The alarming rate of wetland depletion has once again come into focus, as this year's Asian Waterbird Census recorded a 13% decline in bird populations compared to the previous year. This sharp drop highlights the growing threats to these fragile ecosystems, including habitat destruction, pollution, and climate change. The census gives a clear message of protecting our water bodies. ▪


Asian openbill ▶


Purple heron ▶


Oriental darter ▶


Watercock ▲

Photos:
A.K. Shivakumar
Fairoz Beegum
M.A. Latheef
Reji Chandran


Black-winged stilt ▲

MISSION FFW

Human-wildlife conflict has become a significant challenge in many regions, often resulting in both human and animal suffering. One of the key strategies to mitigate this issue is preventing wildlife from entering human settlements. One such strategy is Mission Food, Fodder, and Water (Mission FFW), which is emerging as a promising initiative.

Through Mission Food, Fodder and Water (FFW), efforts are made to ensure the availability of essential resources like water and food for wildlife in their natural habitats, especially in areas prone to human-wildlife conflict. Apart from this, foreign trees like Acacia and Eucalyptus, which deplete groundwater sources are removed and replaced with native tree species. Human-wildlife conflicts are most common from January to May, when water and food sources are scarce.

The mission has three phases:

First stage

In this stage, the focus is on gathering data of forest regions, including fields, check dams, ponds, grasslands and barren lands (geo tagging also included)

Second Stage

This phase focuses on securing necessary funds and human resources to ensure the success and sustainability of the mission.

Third Stage

This involves preparation of the plan to be executed after the fire season.

Budget 2024-25

Total amount allotted in 2025-26 for Forestry and Wildlife Conservation Sector ₹305.61 Crores

This is more than the previous year by ₹27.55 Crores

During 2025-26, Forestry and Wildlife Conservation Sector focuses on improving water security, mitigating human-animal conflicts, securing the lives and livelihoods of forest dependent communities and sustainable management of forest by keeping forest as a safeguard against climate change.

Mitigating and resolving human – wildlife conflict ₹48.85 Crores

Forest Protection Scheme including components like various forest conservation activities and elimination of wild animal attack ₹25 Crores

Allocated for strengthening forest conservation activities and infrastructure development ₹50.30 Crores

Improving elephant sanctuaries at Periyar, Anamudi, Nilambur and Wayanad ₹3.50 Crores

Kottur Elephant Rehabilitation Centre ₹2 Crores

Adattu Kole Wetlands: A Haven for Birds

Alfin Rafi
PG Student, Aluva U C College

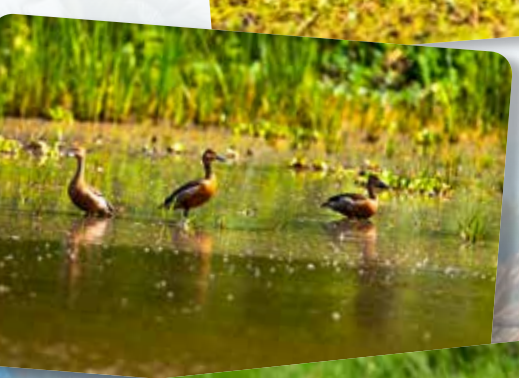
Wetlands, including paddy fields and bird sanctuaries, are ecosystems that remain submerged for up to six months each year. These areas, with their distinct ecological features, offer ideal conditions for agriculture. Besides, these eco systems are vital habitats for a diverse array of bird species. Among the wetlands in Thrissur, Adat Kole Wetlands are known for rich paddy fields.

Adalt Kole wetlands are real paradise for birds. One can frequently come across Grey Heron, Purple Heron, Little Egret, Pond Heron, Night Heron, Red Naped Ibis and White Ibis here. Other birds like Common Ceylon Kingfisher, Pied Kingfisher,White Breasted Kingfisher can also be seen here. Large Green Bea Eater and Small Green Bea Eater belong to this group.

Birds belonging to the order Anseriformes, such as the red-breasted goose Whistling Teal and Cotton Teal, share a body structure similar to that of ducks. With a medium-sized build, these birds are commonly spotted in this area.

Birds commonly seen here from the Columbidae family include Blue Rock Pigeon, Spotted Dove and Emerald Dove. From the Cuculiformes order, species like the Crow Pheasant, Pied Crested Cuckoo, Indian Koel are frequently spotted. Their unique and distinctive calls set them apart from other birds.

Birds commonly found in areas with much water belong to the Gruiformes order. Species such as Grey Headed Swamphen, Kora, White Breasted Waterhen can often be spotted in these areas. Birds belonging to the



Photos:
Aneesh Jayan
Dr. Anoop Rajamony

Ciconiiformes order include Open Bill Strokes and some cranes. Generally, they are found in shallow water bodies and wetlands, where they commonly seek shelter. Their long legs, sharp beaks, and a striking mix of black and gray feathers distinguish these birds.

Birds such as Open Bill Stroke, Cormorant and Indian Shag are commonly found in wetlands and paddy fields. They hunt by diving completely into the water and swimming to catch their prey.

The Accipitriformes order consists of birds like Brahminy Kite, Pariah Kite Eagle, Shikra, Primarily carnivorous, these birds feed on small birds, rodents and reptiles.

Passeriformes, one of the largest order of birds found worldwide, encompassing around 6,500 species across 140 families, can be seen in these Kole wetlands. In these fields, common Passeriformes species like Eastern Swallow, Whiskered tern, Common Myna, Oriole, Common Iora, Racket Tailed Drongo, Drongo, House Crow,Jungle Crow, Tree Pie, Plain Prinia, Magpie Robin are frequently seen thriving in the lush green landscapes of the wetlands.

Birds are most commonly seen here in these kole wetlands from October to January. During this period, migratory birds also arrive, adding to the region's avian diversity. Agriculture in these areas also begin around the same time, marking a season of renewed activity. ▪

The Social Forestry Extension Division, Ernakulam, in collaboration with St. Sebastian U.P. School, Ernakulam, organized a bird-watching session at Mangalavanam Bird Sanctuary for students. As part of the event, a class introducing commonly seen birds was also held. The session was led by the Assistant Forest Conservator from the Social Forestry Extension Division.

Students of the Zoology Department of Chempazhanthi Sree Narayana College are visiting the Palaruvi - Thenmala region as part of a forest study tour. The visit is under the auspices of the Kollam Social Forestry Extension Unit.

A forest study tour in Palaruvi – Thenmala region organized for the Nature Club students of St. Xavier's College, Thumba, under the leadership of Kollam Social Forestry Extension Unit. Deputy Range Forest Officer (Gr) S.K. Janeev, Assistant Professor L. Manju, and Section Forest Officers from the Kollam Social Forestry Extension Unit participated in the event.

WETLAND Q&A

1. Name of the international treaty dedicated to wetland protection.
2. Country where the international convention for the protection of wetlands was signed.
3. Largest tropical freshwater wetland in the world.
4. Largest mangrove forest in the world.
5. India's smallest wetland.
6. After Chilika Lake, the largest brackish water ecosystem located in India situated in Andhra Pradesh that serves as a migratory destination for flamingos from the Rann of Kutch in Gujarat
7. Largest lake in Kerala that is also a Ramsar site.
8. District in Kerala has the largest area of mangrove forests.
9. Which larva's presence is considered the reason for the purity of Sasthamkotta Lake?
10. World's second-largest coastal lagoon and India's first Ramsar site?

(Answers: Page 48)

Prepared:
Reni R. Pillai
Dy. Director, Wildlife Education

Forestry Club

A nature study camp organized by the Ernakulam Social Forestry Extension Department in January for the children of Chelakkara Smt HSS School in the Vazhachal Athirappilly forest area.

Students from the Scouts & Guides of Nilamel NM Higher Secondary School visiting the Palaruvi-Tenmala region as part of forest study. Kollam Social Forestry Extension Unit organized the visit , which was attended by teachers AL Maneesh, V.S. Jayesh, S.V. Vishnu, and Benni Shafiroz, along with officials from the Social Forestry Extension Unit.

A forest study tour organized in January for the NSS - Forestry Club students of Mankode Government Higher Secondary School, Pathanamthitta. Kollam Social Forestry Extension Unit led the team to the Thenmala-Palaruvi region.

An essay writing competition was organized by Neyyattinkara Social Forestry Range on the topic 'Role of students in environmental protection and waste disposal' for SPC students of Virali Vimalahirdaya High School. Abhisha SR won the first place, Anupama SM second place and Nainika Anil third place. Range Officer Shyju. A, Deputy Range Forest Officers MS Binu Kumar, Sunil, Section Forest Officer Shaji, Beat Forest Officer Divya Jasmine, Aquino Teacher and Wilfred Joy participated.

PlanetQuest

WETLAND Q&A

ANSWERS

1. Ramsar Convention
2. Iran
3. Pantanal
4. Sundarbans
5. Renuka Wetland
6. Pulicat Lake
7. Vembanad Lake
8. Kannur district
9. Cavaborus
10. Chilika Lake

Students from Government Higher Secondary School Cheranalloor, Ashramam Higher Secondary School Perumbavoor and Government VHSS Iringol visiting Thundathil Range as part of forest study. The Kerala Forest and Wildlife Department, in collaboration with BETTER TOMORROW organized the study.

Scouts & Guides students of N.M. Higher Secondary School, Nilamel are visiting the Palaruvi - Thenmala region as part of a forest study tour organized by the Kollam Social Forestry Extension Unit. Scout masters of the school, A.L. Manish, V.S. Jayesh, S.V. Vishnu, Benny Shafiros, and officials of the Kollam Social Forestry Extension Unit also participated.

A forest study tour organized by Kollam Social Forestry Extension Unit in Palaruvi - Thenmala region in February for eco-tourism students of Thiruvananthapuram University College. The tour was led by teacher Dr. Manishankar Iyer and forest officials of Kollam Social Forestry Extension Unit.

On the occasion of National Bird Day, the Kollam Social Forestry Extension Unit organized a seminar for the students of Swami Vivekananda Higher Secondary School in January.

Under the Neyyattinkara Social Forestry Range of the Thiruvananthapuram Division, Members of the Forestry Club from Vellanad GKS Government Vocational & Higher Secondary School visited the Chonampara Settlement.

A forest fire awareness class and fire prevention rally organized by the Pathanamthitta Social Forestry Section, Ranni Range in February by the students of Vadasserikkara CMS High School. Pathanamthitta Social Forestry ACF B. Rahul, School Head Mistress Beenakumari, Ranni Social Forestry Range Officer Shuhaib.V. S, Pathanamthitta Social Forestry Range Officer Muhammad Swabir, Section Forest Officer I. Dilip, and Forestry Club Coordinator Biju participated.

School Foresty Club

Write & Win

In an effort to foster a greater sense of responsibility and awareness, and encouraging young voices to engage with conservation and wildlife protection, articles are invited.

The best submissions will be rewarded.

Topic of the Month:

Human-Wildlife Conflict: A Challenge

Article should be sent to:

Director
Forestry Information Bureau
Vazhuthakkad, Thycaud P.O.
Thiruvananthapuram. PIN 695014

Email: forestmediacell@gmail.com

Deadline for submission of entries:
March 31, 2025

A wildfire awareness class organized by the Social Forestry Division, Kozhikode, saw participation from teachers and students of Peringatthur Teachers Education College. Forest Protection Committee President Jacob Mathew, Edathara Section Forest Officer Vijayan P., Ward Member Cicily Jacob, College Principal Hassan K., Lecturer Sujila T., and Retired Deputy Range Forest Officer (Grade) T. Suresh were present.

Students from Kadappakada TKDM Govt. HSS NSS unit visiting the Palaruvi-Tenmala region as part of a forest study tour organized by the Kollam Social Forestry Extension Unit in January. Program Coordinator Dadu S. Das, teachers F. Joshua and G.B.G. Anithamary, along with forest officials from the Kollam Social Forestry Extension Unit, led the tour.

പാമ്പിനെ ഭയക്കണ്ടതില്ല

രക്ഷയ്ക്ക് ഇനി സർപ്പ ആപ്പ്

കണ്ടെത്തിയ പാമ്പിന്റെ ഫോട്ടോ സർപ്പ മൊബൈൽ ആപ്പിൽ അപ് ലോഡ് ചെയ്താൽ പരിശീലനം നേടിയ സന്നദ്ധപ്രവർത്തകർ ഞൊടിയിടയിൽ സ്ഥലത്തെത്തി പാമ്പിനെ പിടികൂടി സുരക്ഷിതമായി നീക്കംചെയ്യും. പ്ലേ സ്റ്റോറിൽ നിന്നും ഡൗൺലോഡ് ചെയ്ത് ഉപയോഗിക്കാം. കേരള വനംവകുപ്പ് ആവിഷ്കരിച്ച് നടപ്പിലാക്കുന്ന സർപ്പ ആപ്പിന്റെ മുഴുവൻ സേവനങ്ങളും തികച്ചും സൗജന്യമാണ്. വനംവകുപ്പ് സർട്ടിഫിക്കേഷൻ നൽകിയ അംഗീകൃത റെസ്ക്യൂവർമാർ എല്ലാവരും സർപ്പയിൽ രജിസ്റ്റർ ചെയ്തിട്ടുണ്ട്. പാമ്പുകളെ സംബന്ധിച്ച സംശയനിവാരണത്തിനും സർപ്പ ആപ്പ് ഉപയോഗപ്പെടുത്താവുന്നതാണ്.

ആപ്പിന്റെ ആവശ്യകത

പാമ്പുകളും മനുഷ്യനുമായുള്ള സംഘർഷത്തിന് ചരിത്രത്തോളം പഴക്കമുണ്ട്. എല്ലാതരം ആവാസ വ്യവസ്ഥകളിലും പാമ്പുകളെ കാണപ്പെടാറുമുണ്ട്. എന്നാൽ കേരളത്തിൽ കാണപ്പെടുന്ന പാമ്പുകളിൽ ബഹുഭൂരിപക്ഷവും വിഷമില്ലാത്ത ഇനങ്ങളാണ്. പക്ഷെ ഭയംമൂലം മനുഷ്യൻ അശാസ്ത്രീയ മാർഗങ്ങളിലൂടെ പാമ്പിനെ പിടികൂടുന്നത് അതിന്റെ നിലനിൽപ്പിന് ഭീഷണിയായി തീരുന്നുണ്ട്. ആവാസ വ്യവസ്ഥയിലെ മുഖ്യകണ്ണിയായ പാമ്പുകളുടെ സംരക്ഷണവും വനംവകുപ്പിന്റെ ഉത്തരവാദിത്വമാണ്.

ഒരു പാമ്പിനെ അപകടകരമായ രീതിയിൽ കണ്ടെത്തിയാൽ പാമ്പിന്റെയോ കണ്ടെത്തിയ സ്ഥലത്തിന്റെയോ ഫോട്ടോ എടുത്ത് ആപ്പിൽ അപ് ലോഡ് ചെയ്യുക.

സന്ദേശ സ്ഥലത്തിന്റെ ലൊക്കേഷൻ ജി പി എസ് മുഖേന കണ്ടെത്തി റെസ്ക്യൂവർമാർ സ്ഥലത്തെത്തും.

വനംവകുപ്പ് പരിശീലനം നൽകിയ അംഗീകൃത റെസ്ക്യൂവർമാരുടെ മേൽവിലാസവും മൊബൈൽ നമ്പറും സർപ്പയിൽ ലഭ്യമാണ്.

ജനവാസ മേഖലയിൽ കാണപ്പെടുന്ന പാമ്പുകളെ സംബന്ധിക്കുന്ന എല്ലാ വിവരങ്ങളും സർപ്പയിൽ ലഭ്യമാണ്.

പാമ്പുകളെ പിടികൂടിയത് മുതൽ എല്ലാ വിവരങ്ങളും ആപ്പിൽ ലഭിക്കും.

പാമ്പിന്റെ വിഷത്തിന് ചികിത്സ ലഭിക്കുന്ന ആശുപത്രികളെ സംബന്ധിച്ച പൂർണ വിവരങ്ങളും ആപ്പിൽ ലഭിക്കും.

കേരള വനം വകുപ്പ്

പാമ്പിനെ ഭയക്കണ്ടതില്ല രക്ഷയ്ക്ക് ഇനി സർപ്പ ആപ്പ്

- പാമ്പുകടിയേറ്റാൽ സമീപത്ത് ആന്റിവെനം ലഭ്യമായിട്ടുള്ള ആശുപത്രികൾ
- പാമ്പിനെ അപകടകരമായി കണ്ടാലോ, അനുബന്ധ സേവനങ്ങൾക്കോ സർപ്പ വോളന്റിയറെ വിളിക്കുക
- അംഗീകൃത പരിശീലനം ലഭിച്ചിട്ടുള്ള വോളന്റിയർമാരുടെ ലിസ്റ്റ്

SARPA

സർപ്പ

ഉരഗ സംരക്ഷണത്തിന്റെ കേരള മോഡൽ

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