June 2025 | Volume 45 | Issue 06 | Price ₹50

ARANYAM

Forest Wildlife Environmental Magazine



World Environment Day 2025

Towards a Plastic Free Future

Wildlife Trapped in Plastic

Ocean of Plastic

Green India Mission

Sabarimala and Plastics

www.forest.kerala.gov.in





മനുഷ്യ വന്യജീവി
സംഘർഷ ലഘൂകരണത്തിന്

വനം വകുപ്പിന്റെ അടിയന്തര പ്രതികരണ സംവിധാനം

സംസ്ഥാനത്ത് ഫോറസ്റ്റ് എമർജൻസി ഓപ്പറേഷൻസ് സെന്ററുകൾ 24 മണിക്കൂറും പ്രവർത്തന സജ്ജം

തിരുവനന്തപുരം വനം ആസ്ഥാനത്ത്
സ്റ്റേറ്റ് ഫോറസ്റ്റ് എമർജൻസി ഓപ്പറേഷൻസ് സെന്റർ

91884 07510, 91884 07511

വിവിധ ജില്ലകളിലെ വനം ഡിവിഷനുകൾക്കു കീഴിൽ 36 ഫോറസ്റ്റ് എമർജൻസി ഓപ്പറേഷൻസ് സെന്ററുകൾ

	ഫോറസ്റ്റ് ഡിവിഷൻ	ജില്ല	മൊബൈൽ നമ്പർ		ഫോറസ്റ്റ് ഡിവിഷൻ	ജില്ല	മൊബൈൽ നമ്പർ
1.	തിരുവനന്തപുരം	തിരുവനന്തപുരം	91884 07517	19.	ചാലക്കുടി	തൃശ്ശൂർ	91884 07529
2.	നെയ്യാർ വൈൽഡ്‌ലൈഫ്	തിരുവനന്തപുരം	91884 07519	20.	തൃശ്ശൂർ	തൃശ്ശൂർ	91884 07531
3.	അച്ചൻകോവിൽ	കൊല്ലം	91884 07512	23.	വാഴച്ചാൽ	തൃശ്ശൂർ	91884 07532
4.	പുനലൂർ	കൊല്ലം	91884 07514	24.	പീച്ചി വൈൽഡ്‌ലൈഫ് സാങ്ച്വറി	തൃശ്ശൂർ	91884 07533
5.	തെന്മല	കൊല്ലം	91884 07516	25.	മണ്ണാർക്കാട്	പാലക്കാട്	91884 07534
6.	ശെന്തുരുണി വൈൽഡ്‌ലൈഫ് സാങ്ച്വറി	കൊല്ലം	91884 07518	26.	നെന്മാറ	പാലക്കാട്	91884 07535
7.	റാന്നി	പത്തനംതിട്ട	91884 07515	27.	പാലക്കാട്	പാലക്കാട്	91884 07538
8.	കോന്നി	പത്തനംതിട്ട	91884 07513	28.	പറമ്പിക്കുളം ടൈഗർ റിസർവ്വ്	പാലക്കാട്	91884 07539
9.	ഇടുക്കി വൈൽഡ്‌ലൈഫ് സാങ്ച്വറി	ഇടുക്കി	91884 07520	29.	സൈലന്റ് വാലി നാഷണൽ പാർക്ക്	പാലക്കാട്	91884 07540
10.	ഇരവികുളം നഷണൽ പാർക്ക്	ഇടുക്കി	91884 07521	30.	നിലമ്പൂർ നോർത്ത്	മലപ്പുറം	91884 07536
11.	പെരിയാർ (ഈസ്റ്റ്)	ഇടുക്കി	91884 07522	31.	നിലമ്പൂർ സൗത്ത്	മലപ്പുറം	91884 07537
12.	പെരിയാർ (വെസ്റ്റ്)	ഇടുക്കി	91884 07523	32.	കണ്ണൂർ	കണ്ണൂർ	91884 07541
13.	മങ്കുളം	ഇടുക്കി	91884 07526	33.	ആറളം വൈൽഡ്‌ലൈഫ് സാങ്ച്വറി	കണ്ണൂർ	91884 07546
14.	മറയൂർ	ഇടുക്കി	91884 07527	34.	കാസർഗോഡ്	കാസർഗോഡ്	91884 07542
15.	മൂന്നാർ	ഇടുക്കി	91884 07528	35.	കോഴിക്കോട്	കോഴിക്കോട്	91884 07543
16.	കോട്ടയം	കോട്ടയം	91884 07525	36.	വയനാട് നോർത്ത്	വയനാട്	91884 07544
17.	കോതമംഗലം	എറണാകുളം	91884 07524	37.	വയനാട് സൗത്ത്	വയനാട്	91884 07545
18.	മലയാറ്റൂർ	എറണാകുളം	91884 07530	38.	വയനാട് വൈൽഡ്‌ലൈഫ് സാങ്ച്വറി	വയനാട്	91884 07547

അടിയന്തര സാഹചര്യങ്ങളിൽ വിളിക്കൂ... നിങ്ങളെ സഹായിക്കാൻ ഞങ്ങളുണ്ട് കൂടെ.

JUNE 2025 VOLUME 45 ISSUE 06

ARANYAM

Forest - Wildlife Environment Magazine

English Version of ***Aranyam Magazine*** in Digital format

Editorial Board

Bishwanath Sinha IAS
Rajesh Raveendran IFS
Dr. P. Pukazhenthi IFS
Dr. Pramod G. Krishnan IFS
Dr. J. Justin Mohan IFS

Chief Editor

Rajesh Raveendran IFS
Principal Chief Forest Conservator &
Head of Forest Force

Managing Editor

Dr. Pramod G. Krishnan IFS
Chief Wildlife Warden

Executive Editor

Baiju Krishnan
Director, Forestry Information Bureau

Asst. Editor

Prabhat Nair
Asst. Forest Publicity Officer

Content Editor

R.S. Sreekumar

Layout Designer

Shaiju K.K.

The opinions expressed by the authors are their own and do not necessarily reflect the views of the government. The authors are solely responsible for their statements and perspectives.

Forestry Information Bureau Publication:

forestmediacell@gmail.com
0471 2529144/145

Submit your content to:

Forestry Information Bureau
Vazhuthakkad, Thycaud P.O.
Thiruvananthapuram - 695014
Email: forestmediacell@gmail.com

For Subscription:

For school and college students, the annual subscription is **₹500**, and for the general public, it is **₹600**. The amount can be paid under the head **BH-0406-01-800-89** in the treasury or via money order in the name of the **'Executive Editor, Aranyam, Forestry Information Bureau, Forest Headquarters, Vazhuthacaud, Thiruvananthapuram'**. A copy of the payment receipt should be sent to **forestmediacell@gmail.com**.

Cover Photo:

Geena Anoop

www.forest.kerala.gov.in



editorial

Every year on June 5, we observe World Environment Day, a powerful reminder of the unbreakable bond between humanity and the natural world. This observance traces its roots back to the 1972 Stockholm Conference, where the decision was made to dedicate a special day to this crucial connection. Each year, World Environment Day comes with a new theme focused on environmental protection. This year's theme, "Beat Plastic Pollution," urges us to discourage the use of plastic.

The recurring threat of plastic pollution has been a central theme for Environment Day, highlighted in both 2018 and 2023, and again this year. This repetition isn't an oversight but a stark indicator of the severe and escalating crisis faced by the planet. Many of our pristine natural habitats are now gravely affected by extensive plastic pollution. Plastics travel through rivers, ultimately reaching the oceans, where they form vast plastic islands. This poses a direct threat to marine life, including fish.

Kerala's wildlife sanctuaries and ecotourism centers are among the most visited tourist destinations. To safeguard these pristine forest areas from plastic litter, the Forest Department has implemented strong measures. To ensure that visitors do not litter these pristine forest areas with plastic waste, the Forest Department has taken every necessary precaution.

Further, the Forest Department has implemented a comprehensive project called 'Green Grass' specifically for the removal of plastic and other waste from forests. The Forest Department has also empowered members of the Forest Protection Force, volunteers, EDC (Eco-Development Committees), and VSS (Vana Samrakshana Samithi) to remove any plastic waste noticed within the forest.

We can't ignore this urgent plea. Let's all recognize the importance of the critical message of World Environment Day and act with diligence in protecting our natural world.

Dr. P. Pukazhenthi IFS
Head of Forest Department (Full Additional Charge)
A.P.C.C.F. (Finance, Budget & Audit)

INDEX

ലേഖനങ്ങൾ

6 **Towards**
a Plastic Free Future
- A K Saseendran

8 **Plastics in Forest**
Endangering Nature's Balance
- Reney R Pillai

11 **Humanity, Development and Environment;**
A Delicate Balance
- C R Ravi

14 **Wildlife**
Trapped in Plastic
- Dr Anuraj

17 **Ocean of Plastic**
Problem and Pathways to Management
- Dr. A. Bijukumar
- Suvarna S. Devi

38







ലേഖനങ്ങൾ

22 **Beyond Beauty**
Waste Management as the Core of Ecotourism
Harikrishnan K

25 **Battling Plastic**
to Save Our Mangroves
Ayona Jayadev

29 **Root Trainer**
Forest Department's Eco- Friendly Innovative Step

30 **Green India Mission**
Dr. J. Justin Mohan IFS

32 **Periyar Tiger Reserve**
A Plastic-Free Success Story
Akhila Suresh

34 **Be Vigilant Against Plastic**
A Shanawaz IFS

36 **Sabarimala and Plastics**
Ashok A S

44 Forest News

49 Forestry Club

40 **Butterflies**
Nature's Health Indicators
Remya Raghavan

42 Legacy in Light
Dhanukodi
A Memoir
Sreekumar Ramakrishnan



Towards a Plastic Free Future



A K Saseendran
Minister for Forest and Wildlife

Our state is at present on a path of development, with projects being implemented with a clear objective of ensuring that these developments do not harm the environment we inhabit. Here, we have both proponents of development who solely focus on growth, and environmental enthusiasts who prioritize only conservation. However, the true key to our advancement lies in striking a balanced approach between these two perspectives.

Plastic, a by-product of industrial development cannot be naturally decomposed by the Earth and soil, is a threat to the very survival of all living beings. Recognizing this grave situation, this year's World Environment Day theme, 'Beat Plastic Pollution', aims to discourage the use of plastic, which is slowly eroding the Earth's health. The various chemical pollutants emanating from plastics are contaminating the entire planet. These chemical wastes, spreading through diverse sources, significantly impact the health of all living organisms, including humans. It's precisely for this reason that non-recyclable plastic products have been banned here.

To prevent plastic items brought by tourists and pilgrims from entering the forests, strict inspections are conducted before entry is permitted. To ensure our forests remain plastic-free, the Forest Department conceived and implemented the 'Green Grass'



> The true key to our advancement lies in striking a balanced approach between these two perspectives.

project. This initiative has been a success due to the support of various groups, including Forest Department officials, VSS (Vana Samrakshana Samithi), EDC (Eco-Development Committees), non-governmental organizations, school and college students among others.

In nature, humans don't have a separate health system. We must understand, now more than ever, that the survival of all depends solely on a "One Health" approach, safeguarding the well-being of nature and all its creatures. Therefore, we need to control our plastic consumption and focus more intently on eco-friendly products.



Plastics in Forest
Endangering Nature's Balance

Photo: **Geena Anoop**

Reney R Pillai
Deputy Director,
Wildlife Education



Our forests which are more than fifty million years old are among the most intricate and finely tuned ecosystems on earth. Within these vibrant woodlands thrives a symphony of life, where every organism, from the tiniest insect to the apex predator, plays a vital role in maintaining a seamless natural cycle. Waste, as we know it in human terms, does not exist here. What decays in one part of the forest simply becomes nourishment for another. From the towering canopies that reach for the sky to the dense, light-blocking branches, the robust trunks of trees, and the intricate root systems conversing beneath the soil, everything plays a role here. Even fallen logs and heaps of dry leaves play a crucial role. Together, they ensure the continuous, cyclical exchange of water, chemicals, gases and nutrients within the soil. Whether it's a hunting tiger, a grazing deer or a bee flying with pollen, nothing is left behind when they live and die – except, of course, the enduring chain of life itself!

> Waste, as we know it in human terms, does not exist in forest. What decays in one part of the forest simply becomes nourishment for another

Plastic: Disrupting Nature

Plastic, a non-degradable material, poses a lasting threat to nature's inherent balance. While environmental and health crises stemming from plastic are numerous, it's practically impossible for us to live entirely without it in today's world. Nevertheless, when plastic finds its way into the most delicate natural areas, like forests, it profoundly disrupts the continuous regeneration cycle that has evolved over millions of years.

Whether directly or indirectly, humans are the sole source of waste in our forests. This becomes clear when we examine the situation in three forest areas in Kerala which has a steady stream of visitors.

Sabarimala

Sabarimala is one of South India's famous temples located within a forest visited by lakhs of devotees, annually. In the last festival season alone (Mandalakalam), around 3.2 million devotees visited Sabarimala. The Devaswom Board and the Forest Department have been actively working to reduce plastic use, including items carried in the 'Irumudikettu' (sacred bundle). For this, multi-lingual messages from prominent personalities were circulated through reels and other social media platforms. Despite these efforts, Sabarimala, located within the Periyar Tiger Reserve, generates about 35 truckloads of waste daily. This waste is primarily cleared by members of the 'Vishudhi Sena' and volunteers from the 'Pavitram Sabarimala' project. Shockingly, more than half of this waste is plastic. At the Devaswom Board's waste treatment plant in Pandithavalam, approximately 15,000 kilograms of waste are incinerated daily using three incinerators. Again, half of this is plastic.

Athirappilly - Vazhachal

Athirappilly-Vazhachal forests along the Chalakkudy River is an area renowned for its exceptional biodiversity and captivating beauty. Receiving about 14 lakh visitors annually, this region has implemented a well-organized waste collection system, managed by the Forest Protection Committee. Apart from facilities for sorting and cleaning the collected waste, a plastic shredding unit also operates here. This unit is used to break down large plastic items into smaller particles. Plastic water bottles make up the largest portion of waste here. For example, in 2023-24 alone, approximately 2,600 kilograms of plastic bottles were collected. All the plastic waste is sorted, cleaned and shredded for sale. This not only keeps the forest clean and well-maintained but also generates a modest income for the local Forest Protection Committee.

> When plastic finds its way into the most delicate natural areas, like forests, it profoundly disrupts the continuous regeneration cycle that has evolved over millions of years.

Agasthyamala

Agasthyamala, located at the southern tip of the Western Ghats is a destination for an annual pilgrimage lasting over a month. It involves a relatively arduous two-to-three-days trek, covering about 48 kilometers through the forest. Only 100 people are allowed to trek each day during the pilgrimage season. This year, 3,576 people visited Agasthyamala. This strict control of visitors coupled with rigorous checks to ensure visitors carry no waste, helps to protect the extremely fragile ecosystem and rare species. As per a Kerala High Court order, no activities other than the trek itself are permitted. Thanks to these dedicated efforts, the forest areas here remain completely waste-free even after the 34-day pilgrimage.

Project Green Grass

Forests constitute nearly 30% of Kerala's total geographical area, which spans approximately 39,000 square kilometers. Within and adjacent to these forest lands live a significant population: 15,225 tribal families and 7,062 non-tribal families. Recognizing the escalating problem of waste, particularly plastic litter, found near human settlements bordering forests and along busy roads that cut through them, the State Government launched Project Green Grass in 2019-2020. This initiative is a collaborative effort between the Forest Department and the Local Self-Government Department, integrating various government agencies. The project also benefits significantly from the efforts of numerous organizations, including the Ex-servicemen Charitable Trust in Munnar.

As part of Project Green Grass, 125 waste dumps were geo-tagged across Kerala's forests. These places were frequently visited

by wild animals, including elephants and wild boars. Through an intensive clean-up drive under the project, waste was successfully removed from nearly 100 of these locations. However, some waste piles couldn't be entirely cleared. This issue is of concern when one considers that Kerala handles approximately 3.7 million tonnes of hazardous waste annually and around 10,000 tonnes of other garbage daily. A significant portion of this hazardous waste is plastic.

Issues and the Path Forward

From the above three examples, it is clear that regulating visitors in controlled environments to the forests can manage waste to a significant extent. In such places, the amount of waste generated is minimal, making it easier to handle. However, in deep forest areas like Sabarimala, where millions of visitors arrive within a short period, waste control and disposal is a complex and challenging crisis.



The main focus should primarily be on a three-step problem-solving approach. The first step is for widespread awareness campaigns to ensure that every visitor understands that carrying waste, especially plastic, into forest areas is strictly forbidden. This must be a continuous effort, involving all relevant stakeholders. It's crucial to recognize that the funds allocated for this awareness are not an expense, but an investment towards our future.

The second step involves imposing adequate penalties on visitors who violate rules and regulations. The revenue generated thus could be utilized for the maintenance and upkeep of forest areas. This will require more cameras and staff for effective monitoring. Additionally, shops adjacent to forest areas and within nearby human settlements must completely eliminate such prohibited items, and strict action should be taken against those who disregard these regulations. While advising against plastic, it's also essential to ensure that suitable alternatives are readily available to vendors at reasonable prices.

It's not just through visitors that plastic is deposited in forests. They reach our forests through natural disasters like floods and landslides. A permanent solution to this issue isn't possible without responsible waste management becoming ingrained in public consciousness. An urgent need for proper systems for segregating, collecting, preserving and transferring waste for recycling in forest areas, especially in places where the waste problem is severe, is very much needed. When we take such measures without compromise, there's a strong likelihood that the waste issue will significantly decrease. Additionally, initiatives like selling souvenirs made from recycled plastic can both generate income and spread an important message.

The Kerala High Court recently issued an order prohibiting single-use plastics at wedding ceremonies and in all hill tourism centers across the state.

While our Constitution guarantees clean environment as a fundamental right for every citizen, it also enshrines the protection of environment, including forests, rivers and wildlife, as a fundamental duty. We must recognize that the responsibility to uphold this duty rests squarely with us. ▪

Humanity, Development and Environment; A Delicate Balance



C R Ravi
Freelancer

The environment plays a major role in sustaining every life and every living being. Key elements influencing the environment include water, air, soil, plants, species, climate and habitat. The delicate balance and interconnectedness of these components are fundamental to the very existence of life on Earth. To understand and study these vital aspects, various academic disciplines exist. The study of the environment itself is known as Ecology. For those interested in understanding relationships between organisms and their environment in the past, the field is called Paleo Ecology. When we explore the intricate relationship between the environment and genes, we delve into Environmental Genetics, a sub-branch of genetics. Tourism related studies is termed Ecotourism. And for artistic critique conducted through an environmental lens, there's Environmental Aesthetics.

Habitat and Environment

Life on Earth depends on the intricate relationship between living organisms and their environment. Plants, animals and microorganisms all interact with the physical world around them, forming what we call an ecosystem. These systems rely on balance—

where every element plays a role in supporting the whole. But when ecosystems are damaged the balance is disturbed, often with lasting consequences for both nature and human life.

The fundamental lesson of environmental protection is to ensure the survival of everything in nature, in accordance with their inherent natural state. India is home to eight percent of the world's biodiversity. The rich variety of countless wild plants, animal species, agricultural diversity, a wide array of grains, fruits and spices underscore the critical need for environmental conservation. We must grasp the profound truth that humanity's survival utterly depends on the healthy existence of all these elements.

In the Name of Development

The demolition of flats at Maradu in Ernakulam in January 2020, due to violations of Coastal Regulation Zone norms has sent a clear message to society. Such constructions in the name of progress and development disregard laws designed to protect our environment. Excessive urbanization leads to destruction of farmlands, wetlands and forests, contributing to the demise of countless microorganisms. Alongside this urban sprawl, the volume of non-biodegradable waste in cities also escalates, posing a severe threat to public health. The spread of COVID-19 in Mumbai's Andheri area serves as a stark reminder of these consequences. With 55 percent of the global population concentrated in urban centers, and a return to rural life being practically impossible, what we urgently need are eco-friendly cities. This demands not just government regulations but self-regulation. Laws must also be followed in their true spirit.

The Population Challenge

One of the major challenges the world faces in the environmental sector is the uncontrolled increase in population. Today, the global population stands at seven billion, but projections based on current growth rates indicate it will reach 9.1 billion by 2050. An estimated 15,480 children are born worldwide every hour. The uncontrolled population growth would in the future lead to shortage of food and water, unemployment, environmental pollution and rampant urbanization. The impact of these issues on our environment is immense. Population growth ultimately leads to a human-centric society, which poses a significant challenge to other living species and natural resources. When population growth creates a situation where nature's own balance becomes impossible to maintain, the threat it poses to Earth is substantial. As such, we must not view population merely as a governmental issue, but as a fundamental matter of survival.

> Droughts and floods are increasingly creating refugees. Large-scale hydroelectric projects, rapid urbanisation and industrialisation often lead to displacement of communities.



Refugees

While wars between nations claim countless lives, they also displace millions, turning them into international refugees fleeing their homelands due to conflict. However, contemporary studies reveal that the flow of refugees caused by climate change is far greater. Droughts and floods are increasingly creating refugees. Large-scale hydroelectric projects, rapid urbanisation and

industrialisation often lead to displacement of communities. This directly and indirectly impacts the environment. The majority of those displaced by such development are from tribal communities. In India alone, millions have been uprooted for various hydroelectric projects. For instance, the Polavaram project in Andhra Pradesh displaced 1.5 lakh people, the Sardar Sarovar project 140,000 and its sub-project the Bargi Dam displaced 100,000 people. All these people displaced should be considered as environmental refugees that severely impact the environment. The number of refugees caused by natural phenomena worldwide is increasing year by year. Countries like Sudan, Somalia, Bangladesh, the Marshall Islands in America and Mexico are prominent in generating such refugees. UN records indicate that there were 25 million environmental refugees globally in 1995. The fact that this number has now reached 50 million clearly highlights the growing scale of the refugee issue and its devastating environmental impact.

Environment, Pollution, Birds

The detrimental effects of environmental pollution caused by human intervention were first extensively studied in birds. The impact of pollution was seen in the sharp decline of Peregrine Falcon population in the 1980s. The research revealed that chemicals like DDT, Aldrin and Dieldrin had led to the decline of these birds. Further, the destruction of forests, disappearance of wetlands and transformation of rivers into stagnant pools have all adversely affected the migration patterns of various migratory bird species. Scientists also use indicator species to understand environmental changes. The environmental problems caused by chemical radiation and waste discharge have negatively impacted several microorganisms as well.

Unfortunately, we are committing the greatest atrocities against environment in the name of progress, development, and growth. When environmental balance is disrupted, the very existence of life faces a threat. The harsh reality is that by the time we recognize all of this and attempt to turn back, the possibility of recovery might already be lost.

World Environment Day is celebrated every year on June 5, driven by the understanding that ecological balance is fundamental to the very existence of life. This year, the United Nations has chosen plastic pollution control as the theme for international Environment Day celebrations. This critical threat to our planet and its future forms the backdrop for highlighting the plastic crisis. The most significant message from this year's observance is that we can ensure lasting survival of life only when a strong awareness regarding this issue permeates society. ▪

> When environmental balance is disrupted, the very existence of life faces a threat.



Wildlife Trapped in Plastic

Dr Anuraj
Assistant Forest Veterinary Officer



The sinking of a ship and its cargo off the coast of Kerala in May had recently dominated the news. Initial discussions largely revolved around the potential petroleum fuel spill from the vessel and its subsequent environmental impact. However, the focus soon shifted to containers. While the public initially feared that the containers might hold something highly detrimental to humans, there was a collective sigh of relief when it was discovered they contained microplastic materials. But was this truly a news to be relieved about? Only time will tell.

For humans, plastic has become an integral part of daily life, presenting a double-edged sword: its perceived necessity balanced against its undeniable environmental harm. But for other living beings on Earth, plastic is entirely different. In fact plastic is harmful for them. Among the many types of plastics causing damage, the most insidious, as previously mentioned, are microplastics.

Generally, plastic is understood to impact living organisms in three primary ways:

- When consumed directly or through contaminated food.
- When animals get physically trapped or caught in plastic debris.
- When it causes complete damage to their ecosystems.

Food is fundamental to the survival of any living creature. As such, it is every organism's right to have access to food items that are beneficial for their growth and digestive system. But is this generally what happens? Absolutely not, especially in this era, where plastic consumption and unscientific waste management are breaking all bounds. From wild animals like elephants and smaller creatures that depend on garbage heaps created by humans to marine life mistakenly ingesting microplastics as food, the consequences are dire. The very basic right to appropriate nourishment is being severely compromised for countless beings across the globe.

From Mountain Peaks to Ocean Depths

You don't need extensive research to know how widespread plastic pollution has become, from mountain tops to the deep sea. It's everywhere. From the plastic wrappers thrown away by tourists on mountains and roads to the waste that flows from human settlements through rivers to ocean floors and beaches, plastic is found everywhere. This plastic impacts creatures in diverse and devastating ways. Consider ruminants like deer and wild buffalo for instance. Their digestive systems are uniquely adapted to break down tough, fibrous plant matter, thanks to a large fore-stomach called rumen, which is one of their four stomach chambers. Food is stored here and repeatedly regurgitated for further chewing before either being swallowed again or passed through the digestive system. When plastic waste is ingested along with their food, it often gets trapped in the walls or at the bottom of the rumen, unable to pass through. Over time, this accumulation can lead to the animal's death. Elephants, on the other hand, have a different digestive process. Despite their massive size, they have relatively small mouths, meaning they must eat continuously to consume enough nutrients for their bodies. Their digestion largely occurs in the hindgut. We often see domestic elephants, which primarily eat fibrous foods like palm fronds and coconut leaves, suffering from severe constipation. Imagine the catastrophic obstruction plastic waste causes in such a comparatively simple digestive system—the impact is truly beyond imagination. We are constantly witnessing how plastic waste reaching water sources and the seabed transforms into microplastics and enters the food chain through fish and other aquatic life. In essence, the plastics we discard are finding their way back into our own bodies through various ways.

The plastics we discard are finding their way back into our own bodies through various ways.



Entangled

Beyond ingestion, another tragic problem is that animals entangle in plastic waste, such as fishing nets and bottles, leading to prolonged suffering or death. Aquatic animals, generally unable to use their limbs like we do, are particularly vulnerable to getting caught in these items. Consider the numerous examples of sea turtles caught in fishing nets, cormorants struggling or birds with bottle caps and plastic rings twisted around their legs and necks, slowly succumbing to death. In both wild and domestic environments, cloven-hoofed animals face unique challenges due to their physical structure. Plastic items can get stuck above their hooves, gradually tightening and fusing with the flesh, eventually causing the hooves to fall off. Even more horrifying are the cases involving animals like elephants, where plastic ropes can entangle their front legs, leading to an inability to walk and ultimately causing death. The countless instances of snakes and other small creatures dying after getting trapped in fishing nets further emphasize the profound depth of this ongoing crisis.

Where Are the Nests?

A curious sight once had made headlines: a crow's nest in the middle of a city. This seemingly intelligent crow chose an electric pole as its nesting site and used metal scraps and plastic strings instead of twigs for making its nest. While one might say birds are simply adapting to changing times, there's a deeper implication here: foreign objects like plastic are severely impacting habitats. We should never forget that everything, from an elephant's footprint to a tiny pebble, constitutes a miniature ecosystem. Into these delicate spaces, plastic is relentlessly encroaching.

Are There Alternatives?

Completely eliminating plastic may not be feasible in today's world. This realization should guide our thinking about alternatives. It's essential to explore practical solutions right from reducing plastic usage to ensuring its proper disposal and recycling. One inspiring example can be seen in the initiatives of Green PTR, which has been focusing on eco-tourism. They collect all kinds of waste materials and send them to designated processing centers. Similarly, across Kerala, many panchayats have begun collecting household waste through Haritha Karma Sena. These efforts need to be strengthened and expanded.

There are global models worth emulating, especially in the healthcare sector. Countries like Japan teach waste management principles to students from their early school days. In public spaces, waste is never left unattended. It is systematically processed with great care. These nations set examples that we too can follow in several areas.

As we move toward sustainable development, environmental protection and ecological balance must be prioritized. True progress lies in ensuring that every species on Earth has the space and opportunity to thrive. Only then can humanity find a sustainable place within this planet's ecosystem. This awareness should mark the beginning of meaningful change. ▪

Completely eliminating plastic may not be feasible in today's world. This realization should guide our thinking about alternatives.



Ocean of Plastic:
Problem and Pathways to Management

Dr. A. Bijukumar
Suvarna S. Devi
Marine Monitoring Lab,
Aquatic Biology Department of Fisheries,
University of Kerala



What do the Mariana Trench, the deepest part of the ocean, and Mount Everest, the world's highest peak, have in common? Despite being the planet's most remote and inaccessible environments, both are unfortunately littered with pieces of plastic from human activities miles away. Decades of economic growth and our increasing reliance on disposable plastic products have led to an uncontrolled surge of waste. This waste finds its way into lakes, rivers, coastal environments and ultimately the ocean. The vast majority of solid waste entering our seas is, shockingly, plastic. We are witnessing large amounts of plastic waste on our coastlines, estuaries, distant islands and even in sea ice. This pervasive presence of plastic serves as a stark reminder of humanity's profound impact on even the most pristine corners of our Earth.

At present, a staggering 400 million tonnes of plastic waste is produced annually. Projections indicate an alarming future: by 2050, global primary plastic production is expected to soar to 1,100 million tonnes. India is estimated to have produced 19.3 million tonnes (metric tons) of plastic in 2024. The current 11 million metric tons of plastic entering the ocean each year is predicted to triple within the next twenty years. This means that by 2040, a horrifying 23 to 37 million metric tons of plastic could be flowing into our oceans annually.

Each year, millions of metric tons of plastic waste are produced globally. Though half of it is recycled, incinerated or sent to landfills, a significant portion of what remains ultimately finds its way into the oceans. A smaller fraction of this marine

plastic directly comes from discarded fishing nets. However, most of the plastic entering the oceans has a different origin. Wind and rainwater carry a small portion of plastic waste into the ocean. But staggeringly, an estimated 80 percent of plastic discharged into the sea comes from rivers. This accounts for a colossal 0.8 to 2.7 million tons annually.

Unlike industrial pollution and oil spills, marine plastic pollution often goes unnoticed by the public. Its true scale remains largely invisible, as most ocean-bound waste lies hidden beneath the waves.

Kerala's more than 600 kilometer coastline, which is home to a third of the state's population, is one of India's most densely populated coastal areas. Kerala's intricate system of rivers, estuaries and backwaters provides a direct conduit for land based waste to reach the sea. This was highlighted during the 2018 floods. A recent study by Kerala University's Marine Monitoring Lab found substantial plastic waste deposits along the coast, extending up to 50 meters from the shore. Compounding the issue, vital rocky habitats, crucial for marine life and biodiversity, are unfortunately choked with "ghost nets."

Microplastics: A Growing Concern

The ocean's waves and currents relentlessly break down large plastics into microplastics. These fragments, smaller than five millimeters, are now a pervasive and lasting pollutant in marine environments. Even more concerning are microfibers and nanoplastics, tiny contaminants posing significant environmental and health risks. Microfibers often shed from synthetic clothes during washing. Nanoplastics under one micrometer come from degrading plastics or direct industrial sources. Their minuscule size allows them to bypass filtration systems, quickly entering waterways. Critically, these ultrafine particles can also bypass the body's natural filtration, potentially reaching vital human organs.

Studies reveal high microplastic concentrations along the Kerala coast: 200 pieces per liter in Thiruvananthapuram's water and 180 in Kannur. Sediment samples showed 150 pieces per gram in Kochi and 120 in Kozhikode. Microplastics are also found in estuaries like Ashtamudi Lake and Vembanad-Kole wetlands, sediment and even in edible fish and clams. Crucially, this includes commercially vital species like sardines, mackerel, tuna and deep-sea fish.

The Deadly Issue

Plastic pollution in our oceans is causing severe harm to marine life. Turtles mistake plastic bags for jellyfish, fish consume microplastics and birds even feed plastic to their chicks. "Ghost nets" are a leading cause of harm and death for dolphins, turtles and other ocean creatures. Worryingly, an estimated half of the world's seabirds have ingested marine debris. On the Kerala coast, abandoned plastic waste is commonly found in both seabirds and marine animals.

Plastics in the ocean inflict significant economic and emotional hardship on local fishing communities.

Plastics in the ocean inflict significant economic and emotional hardship on local fishing communities. A heartbreaking reality for many is that their nets frequently yield more plastic than fish. Research conducted between 2017 and 2018 across six coastal areas in Kerala examined the volume and seasonal changes of plastic debris linked to fishing. This study clearly revealed that plastic formed the bulk of the waste found (73.8% by count and 59.9% by weight).

Microplastics and nanoplastics have infiltrated our food chain, including seafood. New studies reveal humans inhale them from the air, ingest them via food and

water, and even absorb them through skin. They've been found in our brains, lungs, liver, spleen, kidneys and even in newborn placentas. While research is ongoing, there's clear evidence that plastic-related chemicals like methyl mercury, plasticizers and fire retardants enter our body. Scientists also suspect common plastic chemicals such as Bisphenol A, phthalates and PCBs are also entering our body. These are concerning as they are linked to endocrine disruption, developmental issues, reproductive problems and cancer, warranting a precautionary approach. Moreover, Microplastics are exceptionally dangerous because their tiny size allows them to absorb harmful chemicals, heavy metals and pathogens from water. These toxins then biomagnify up the food chain. Apart from this, plastic production fuels climate change. In 2020, this energy-intensive process accounted for over three percent of global greenhouse gas emissions.

Pollution Control

While recycling can significantly cut down on plastic production and waste, a critical global issue is the low rate of plastic recycling, which is below ten percent.

Given Kerala's dense population and scarce land, a decentralized strategy for managing pollution isn't just an option but a necessity. This approach involves several crucial steps like embedding 'zero waste' principles into local governance, strengthening community-driven waste management efforts, boosting public awareness about environmental issues and ensuring rigorous enforcement of environmental protection laws. Beyond these, we must strive for more efficient ways to recycle and reprocess our waste. Equally important is the need to fortify pollution control mechanisms to prevent land-based plastic waste from reaching our oceans and to deploy innovative technologies to halt the flow of large amounts of waste into the sea through rivers.



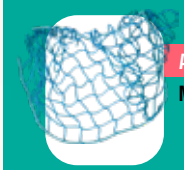
COMPONENTS OF MARINE DEBRIS

Marine litter is anything that humans produce and that ends up in the ocean. Globally, more than 80 percent of marine litter is plastic, and Kerala is no different.

These are some of the common items found in Kerala's coastal waters.



Single-use plastics:
Water Bottles, Straws, Wrappers, Bags



Abandoned fishing gear:
Nets, Ropes, Lines, Floats



Rubber and other synthetic materials:
Slippers, Gloves, Masks



Packaging materials:
Thermocol, Foil, Containers



Household waste:
Diapers, Cloth, Brushes, Medicine Caps, Plastic Tubes

One of the ways to tackle the growing crisis of pollution from single-use plastic products is through redesigning plastic items to last longer. A crucial step is to outright ban or control single-use plastics. By restricting items such as plastic bags, straws and microbeads (which were once common in cosmetics), we can prevent a significant contributor to microplastic pollution.

People from all walks of life such as local residents, fisherfolk, students and tourists have a crucial role in tackling the issue. Community-driven awareness initiatives need to be effectively rolled out across all levels. A comprehensive strategy should not only focus on prevention and cleanup but should also have strong policies and widespread public awareness. Employing such scientific approaches is absolutely essential for successful mitigation planning.

> Promoting reusable or biodegradable alternatives and choosing environmentally responsible brands must be part of the solution.

Plastic pollution in our oceans is a global crisis that knows no borders, making international cooperation essential. As such, countries are now working towards a global treaty to end plastic pollution. The Intergovernmental Negotiating Committee, tasked with drafting the agreement, is meeting in Geneva, Switzerland, from August 5 to 14, 2025. India is also a member. Experts say this move reflects a growing recognition among world leaders of the urgent need for a legally binding framework to tackle the escalating issue. Governments can ban microplastics in consumer products just like the U.S. Microbead-Free Waters Act. They can also come up with strict waste management systems. At the same time, manufacturers can be held accountable through sustainable design mandates and take-back



India aims to achieve zero plastic waste discharge from ships by 2025. As part of its commitment to reduce marine plastic waste, especially from ships and fishing vessels, India is working in line with relevant International Maritime Organization (IMO) regulations. At the national level, the government has established a National Task Force (NTF) to support the goal of completely eliminating plastic discharge into the marine environment.

◀ Plastic debris accumulated on the coast of Shangumugham, Thiruvananthapuram.

programs that cover the full life cycle of plastic goods. Public education on the health and environmental impacts of microplastics can drive more conscious consumer choices. Promoting reusable or biodegradable alternatives and choosing environmentally responsible brands must be part of the solution.

Kerala's bond with the ocean runs deep from its role in the ancient spice trade to its thriving marine and tourism industries today. This long-standing connection makes it all the more unacceptable to treat our seas as dumping grounds. If we fail to act now, the crisis could spiral beyond control, endangering marine biodiversity, depleting critical resources and threatening both the livelihoods of coastal communities and the health of the ocean ecosystem itself. Kerala with visionary planning, collective action and sound policies has a real opportunity to lead in India's fight against marine pollution and turning its legacy of ocean stewardship into a model for the future. ▪

MARINE PLASTIC WASTE



OCEAN OF CLEANLINESS

Suchithwa Sagaram

The Suchithwa Sagaram project, implemented by the Fisheries Department, Government of Kerala in collaboration with fishermen at Neendakara Harbour in Kollam district, has garnered international attention. It is a system in which the fishermen bring plastic caught in their nets to the shore while fishing. They then clean them with the help of women self-help groups and later use them for road construction. However, the said project needs to be implemented and ensured to be continuous across Kerala. The increasing public participation in beach cleaning programmes is a good sign. However, more effective efforts and public pressure for reducing the use of single-use plastics, using alternatives and implementing producer responsibility need to be intensified. The Haritha Kerala Mission and the Clean Kerala Company in Kerala are playing a crucial role in improving waste management systems, especially in coastal towns.

Beyond Beauty

Waste Management as the Core of Ecotourism

Harikrishnan K
Resource Person, Suchitwa Mission





Ecotourism promotes responsible travel that not only involves nature's beauty and biodiversity but also encourages its conservation. It goes beyond sightseeing, offering visitors a chance to connect with the culture, traditions and everyday lives of local communities. As this involves a strong commitment to environmental sustainability, ecotourism centers serve as a reliable source of income for nearby residents and contribute meaningfully to the local economy. Kerala's diverse landscape and favorable climate make it an ideal destination to harness the full potential of ecotourism. Today, 87 ecotourism centers are active across 55 forest divisions in the state, many of which have earned international recognition for their community-based and conservation-driven models.

Waste Management in the tourism industry can often be a challenge. It is no doubt that ecotourism centers, built on the principle of leaving nature undisturbed, maintain excellent cleanliness and waste disposal standards. Yet, with the increasing popularity of ecotourism destinations, the potential for waste to become an issue, even in these pristine areas, cannot be overlooked. Beyond just preventing litter and preserving the visual beauty, it's important to ensure that comprehensive systems are in place for managing all forms of waste. The Kerala initiative in waste management in ecotourism spots in collaboration with other departments and agencies is commendable.

The scientific management of waste generated by tourists at ecotourism centers demands urgent attention. We often see alarming images of wildlife consuming plastic and other harmful waste widely circulated through print and social media.

Plastic Arrest

Poorly managed waste continues to pose a serious threat to the environment, wildlife and even public health. The long-term solution lies in adopting systematic approaches to waste segregation, collection and scientific processing. Several ecotourism centers in Kerala have already taken

proactive steps like Plastic Arrest, which aim to prevent plastic waste from entering fragile ecosystems. However, a challenge remains: pollution from shops and street vendors operating just outside these centers. This often creates a contrast of clean, well-maintained ecotourism sites surrounded by littered and neglected exteriors. Not only does this diminish the natural beauty of the destination, but also undermines the visitor experience and the broader goals of sustainable tourism.

Scientific Waste Management

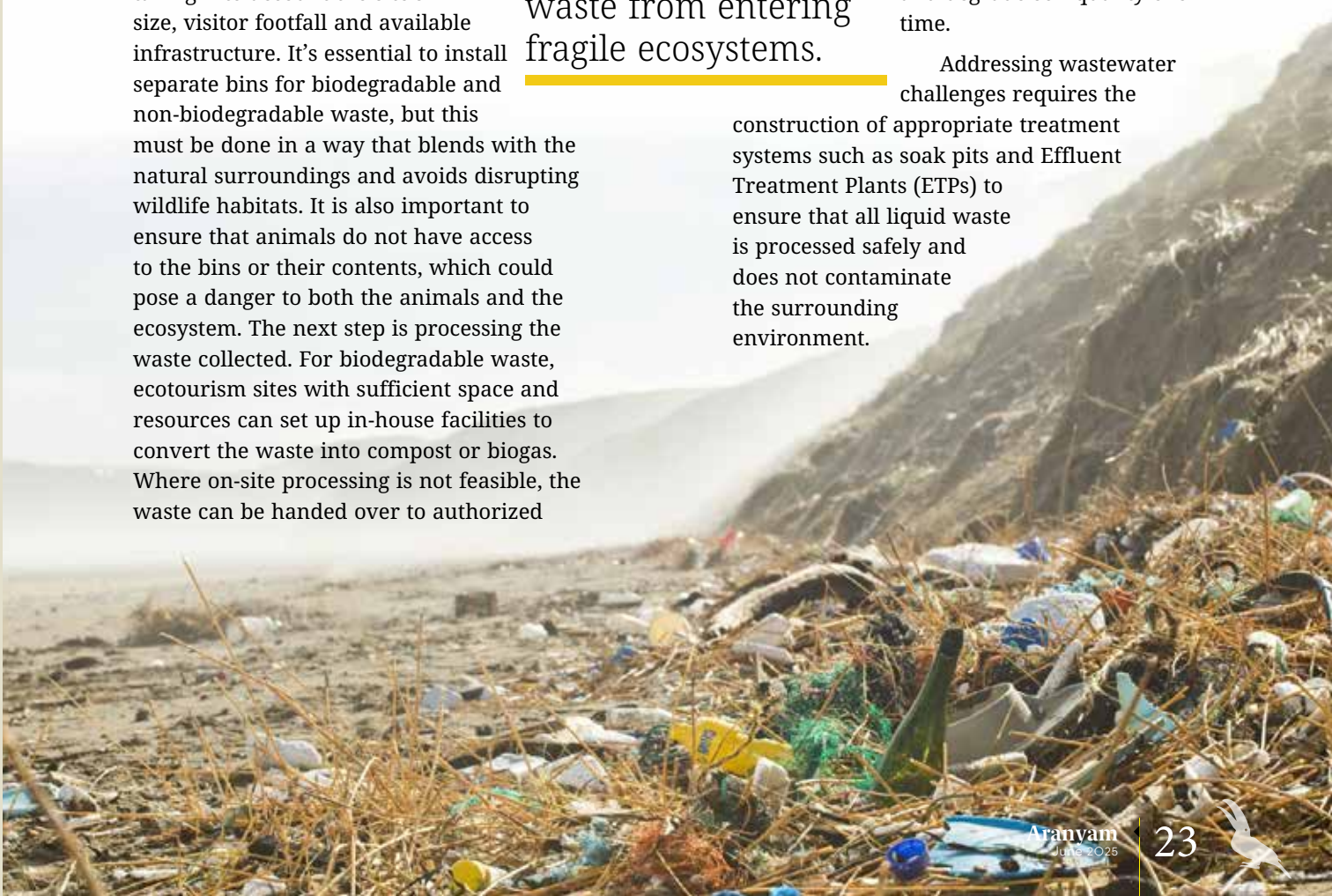
Scientific waste management starts with proper segregation at the source. When solid waste is carefully separated into biodegradable and non-biodegradable categories, its subsequent processing becomes far more efficient and environmentally sound. In ecotourism centers, the placement and number of waste bins must be thoughtfully planned taking into account the site's size, visitor footfall and available infrastructure. It's essential to install separate bins for biodegradable and non-biodegradable waste, but this must be done in a way that blends with the natural surroundings and avoids disrupting wildlife habitats. It is also important to ensure that animals do not have access to the bins or their contents, which could pose a danger to both the animals and the ecosystem. The next step is processing the waste collected. For biodegradable waste, ecotourism sites with sufficient space and resources can set up in-house facilities to convert the waste into compost or biogas. Where on-site processing is not feasible, the waste can be handed over to authorized agencies affiliated with Suchitwa Mission. Non-biodegradable waste, on the other hand, should be kept dry and unmixed with organic matter. It must be collected and transferred to the Haritha Karma Sena for proper sorting and recycling. These non-biodegradable materials are either recycled or disposed of through approved, scientific methods. By rigorously managing non-biodegradable waste, especially plastics, we can drastically reduce the harmful impacts of indiscriminate dumping, which helps in not only safeguarding natural resources but also in promoting a cleaner, healthier environment.

> Several ecotourism centers in Kerala have already taken proactive steps like Plastic Arrest, which aim to prevent plastic waste from entering fragile ecosystems.

Wastewater

Another major category of waste is liquid waste, commonly referred to as wastewater. If discharged without proper scientific treatment, wastewater can contaminate nearby water bodies, aquatic ecosystems and degrade soil quality over time.

Addressing wastewater challenges requires the construction of appropriate treatment systems such as soak pits and Effluent Treatment Plants (ETPs) to ensure that all liquid waste is processed safely and does not contaminate the surrounding environment.



Equally important is the provision of well-maintained public restrooms with adequate sanitation facilities to prevent open defecation and improper waste disposal. Installing informative signboards and providing clear instructions at the entry points of ecotourism centers can guide visitors on proper waste disposal practices. Additionally, training ecotourism staff in scientific waste management methods will enhance operational efficiency and ensure that waste is handled in a safe, consistent and environmentally responsible manner.

Kerala's unique geography and climate have earned it a prominent place on the global tourism map. Ecotourism centers play a vital role in showcasing these natural assets to visitors, offering immersive experiences in nature. As we confront the growing impacts of climate change, it is crucial to recognize the deep connection between waste management and environmental sustainability. Adopting best practices in waste management across all sectors is essential for preserving the very ecosystems that draw tourists to Kerala. Given that ecotourism thrives on unspoiled nature, the sector must place waste management at the heart of its operations. Clean and well-maintained ecotourism centers not only enhance aesthetic appeal but also contribute to long-term environmental health. Importantly, this cleanliness must extend beyond the core tourist zones to include surrounding areas and approach roads. This integrated approach will not only attract more tourists but also foster a sense of responsibility and environmental awareness among them. Moving forward, Kerala's tourism centers should strive to be recognized not just for their natural beauty, but also for their cleanliness and commitment to sustainability. The ecotourism centers that already demonstrate excellence in waste management should continue to strengthen their systems, setting a benchmark for the wider tourism industry across the state. ▪

> Ensuring good waste management practices in all sectors is essential for the protection and survival of nature.



Battling Plastic
to Save Our Mangroves

Ayona Jayadev
Associate Professor, Environmental Science,
All Saints College, Thiruvananthapuram



In the tidal coastal zones of tropical regions, mangroves serve as natural sentinels, standing resilient between land and sea. These intricate ecosystems, with their tangled roots, silty flats and brackish waters are teeming with biodiversity and perform vital ecological functions from buffering storm surges to nurturing marine life. Yet today, these fragile forests are under threat, especially from plastic waste, carried in by tides and rivers. They are choking their roots and disrupting their delicate balance.

Plastic bags cling to mangrove roots like parasites. Bottles, wrappers and other debris swept in by the tides entangle within the intricate root systems of these fragile coastal forests. Over time, these plastics degrade into micro and nano-particles, silently infiltrating the soil, contaminating the water and eventually entering the food chain. Mangroves, already under pressure from rising sea levels, coastal development and land conversion, now face an insidious new threat. The scale of the problem is alarming, demanding immediate attention and action.

Ecosystem Engineers and Coastal Guardians

Spanning approximately 147,000 square kilometers across tropical and subtropical coastlines, mangroves are among the planet's most vital natural defenders. For their extraordinary capacity to store carbon and support rich biodiversity, they are often referred to as "coastal blue forests" or "blue carbon ecosystems," They shelter more than 3,000 species, including commercially valuable fish and crustaceans, migratory birds and apex predators like crocodiles. Their dense root networks act as natural buffers, dissipating wave energy and

reducing coastal erosion, offering essential protection against cyclones, storm surges and tsunamis. Research indicates that just 100 meters of mangrove forest can reduce wave energy by as much as 66 percent. Mangroves are among the most carbon-rich ecosystems in the world. A single hectare can store between 300 and 1,000 tons of carbon. Globally, over 120 million people depend on mangroves for their livelihoods, drawing income from fishing, timber, honey and ecotourism.

Plastic Invasion

Globally, an estimated 11 million metric tons of plastic waste enter the ocean each year. If urgent action is not taken, the number could triple by 2040.

Kerala is not immune to this growing crisis. A 2020 study conducted in Kumbalangi, a fishing village near Kochi, revealed widespread plastic entanglement in mangrove roots, particularly near household waste discharge points. Researchers found plastic bags, wrappers, fishing lines and PET bottles embedded in the root systems, with over 70% of the mangroves surveyed showing visible plastic debris. In Ashtamudi Lake, a Ramsar-designated wetland with dense mangrove fringes, plastic accumulation was observed in 60% of the surveyed plots, particularly near fish landing sites and areas frequented by tourists. Further north, a 2022 assessment by the Kerala State Biodiversity Board reported the presence of macro- and microplastics in the mud of Kannur Azhimukham estuarine complex. This contamination threatens benthic organisms and has direct implications for local crab fisheries, which are economically and ecologically significant to the region.

Once plastic infiltrates a mangrove ecosystem, it becomes incredibly difficult to remove. The tangled root systems and dense vegetation make manual clean-up difficult and often ineffective.

Ecological Impacts

Plastic debris accumulate at the base of mangroves, disrupting critical natural processes. Unlike sandy beaches or open shores, mangroves depend on gas exchange through specialized root structures called pneumatophores. When these are covered by plastic, oxygen flow to the soil is obstructed, hindering seedling development and increased death of the mangrove. Studies have shown that plastic coverage can reduce pneumatophore function by up to 60%, significantly impeding mangrove regeneration.

> The destruction of mangroves contributes to over 40 million dollars in fishing losses each year.



Harm to Fauna

The effects on wildlife are both physical and chemical. Ingested plastic particles have been detected in species that inhabit mangrove ecosystems, such as mud crabs, fiddler crabs, juvenile fish and birds. It is not uncommon to see birds entangled in discarded fishing lines and nets lodged in mangrove branches. These lead to injuries, restricted movement and in many cases, death. Moreover, plastics act as carriers for toxic substances like Persistent Organic Pollutants (POPs), heavy metals, and endocrine-disrupting chemicals. These contaminants leach into the environment, entering the food web through bioaccumulation and posing long-term risks to the health of the entire ecosystem.

Microplastic Contamination in Sediment and Soil

As plastic waste degrades, it fragments into microplastics that embed in the soil. Microplastics can alter soil structure, making it more compact and less porous. This reduces the soil's ability to retain water, affecting plant health and resilience during dry periods. Additionally, microplastics disrupt microbial activity, undermining the tiny but essential organisms that drive nutrient cycling and decomposition processes. Such disruptions compromise the overall ecological functioning of mangrove ecosystems.

Social Impacts: Coastal Communities at Risk

The degradation of mangrove ecosystems directly threatens the lives and livelihoods of coastal communities. Millions of people depend on mangroves for small-scale fishing, fuel wood and crucial shoreline protection from storms and erosion. In regions like Southeast Asia, ecosystem collapse translates into real economic loss. The destruction of mangroves contributes to over 40 million dollars in fishing losses each year. Local governments also bear the financial burden. In many developing countries, municipalities spend up to 15 percent of their coastal management budgets solely on waste removal.

Moreover, the cultural ties that indigenous communities in regions like the Sundarbans, the Amazon and the Pacific Islands share with mangroves are increasingly threatened by pollution and ecological degradation.

Restoration

Despite growing threats, efforts are going on in many regions for restoring mangroves and curb plastic pollution. In Kenya, the Mikoko Pamoja project has become a model of integrated conservation. By combining mangrove replanting, plastic waste removal and community-based carbon credit trading, the initiative has led to the plantation of over 100,000 mangroves since 2014. This has boosted coastal resilience while generating local jobs and income. In the Philippines, an innovative approach in Manila Bay has seen the installation of floating barriers in tributary rivers that diverted more than 20,000 kilograms of plastic away from vulnerable mangrove zones.

Mangroves offer one of nature's most effective defenses against climate change, coastal erosion and biodiversity loss. Yet today, these life-sustaining ecosystems are under threat not from natural forces, but from the growing tide of pollution fueled by modern consumption and inadequate waste management.

This crisis extends beyond environmental degradation. It is is an existential threat to coastal ecosystems and the millions of people who rely on them for food, protection and livelihood. Combating plastic pollution in mangroves requires urgent, coordinated action across all levels: from strengthening local waste management systems and enforcing international environmental regulations, to fostering responsible consumer behavior and reducing single-use plastics. ▪



In the Bay of Jakarta, Indonesia, surveys report that there are more than 1,000 pieces of plastic per square meter in mangroves. In Muthurajawela, Sri Lanka, researchers found 810 kilograms of plastic debris per 10 square meters – mainly bags, bottles and wrappers. In the Niger Delta, Nigeria, plastic accumulation in mangroves has caused a significant decline in fish stocks and soil fertility.

KUMBALANGI MODEL

In Kerala, there are several initiatives that combine mangrove restoration and plastic pollution control. In Kumbalangi, India's first model tourism village near Kochi, the local panchayat, in collaboration with NGOs and citizen groups, has launched a community-based mangrove conservation and waste segregation initiative. This includes installing plastic waste bins in households, holding awareness campaigns for responsible tourism and regular cleaning campaigns targeting the edges of mangroves. The initiative has helped reduce the visible plastic burden in the backwaters, while increasing eco-tourism and local pride. The state-led sustainability initiative, Haritha Keralam Mission, has supported the revitalization of the coastal ecosystem by promoting plastic-free campaigns in schools and local self-government bodies. In Kannur, as part of this mission, a pilot program involved local students in 'mangrove conservation', by combining restoration efforts with plastic waste audits in riparian areas. In the Kol Wetlands and Ashtamudi Lake, community fishermen, with support from the University of Fisheries and Ocean Studies of Kerala, introduced the practice of 'litterforfishing'. During regular fishing trips, fishermen collect plastic debris caught in nets and deliver it to designated bins managed by local government bodies. This not only reduces the plastic burden on mangroves, but also educates fishermen about the long-term economic threats of pollution.





Root Trainer

Forest Department's Eco- Friendly Innovative Step

The Kerala Forest Department has taken a significant step toward sustainable afforestation by introducing Root Trainers, which is considered a revolutionary alternative to plastic bags traditionally used for sapling cultivation. These eco-friendly seedling containers, made from coir pith, offer a permanent solution to the environmental issues caused by plastic waste in planting programs.

Unlike plastic grow bags that contribute to long-term pollution, coir-pith Root Trainers are biodegradable. As the sapling matures, the container naturally decomposes and merges with the soil, leaving behind no waste. This innovation has gained widespread acceptance not only across Kerala but also in other states. Many private nurseries have adopted the model, recognizing its ecological and practical advantages.

During the 2019–20 nursery season, the Kerala Forest Department conducted trials using root trainers made from natural coir fibers. The results were highly promising. Encouraged by this success, the department scaled up the initiative in 2021–22 nursery season, with 25% of total seedling production carried out using these eco-friendly coir-based containers.

Why the Change?

The traditional use of polybags (plastic covers) for nurturing seedlings poses serious environmental challenges. These plastic bags are discarded after planting and rarely reused. Prolonged exposure during nursery stages leaves them brittle, dirty and unsuitable for recycling. As a result, they contribute significantly to non-biodegradable plastic pollution.

To put this in perspective: just one kilogram of plastic can produce approximately 200 polybags. As such, planting up to one crore seedlings annually, translates to nearly 50,000 kilograms of plastic waste dumped into the environment each year. These discarded polybags often clog rivers, streams and wetlands. Many instances of wildlife fatalities have been linked to plastic ingestion or entanglement caused by such waste.

Advantages of Coir Pith Seedling Trays

Beyond their environmental benefit, they also enhance plant health. Coir-based seedling trays offer superior aeration, promoting stronger root development, especially of taproots—critical for seedling survival and long-term growth in the wild. As they naturally decompose in soil, they enrich the growing environment and reduce transplant shock, making them ideal for eco-conscious forestry and horticulture efforts. ▪

GREEN INDIA MISSION

Dr. J. Justin Mohan IFS
Additional Principal Chief Conservator of Forest
(Eco development and Tribal Welfare)



The Green India Mission (GIM) is one of the eight core missions under India's National Action Plan on Climate Change (NAPCC). It was conceived as a proactive response to the anticipated challenges posed by climate change, with a strong focus on the vital role forests play in supporting both ecological balance and the livelihoods of forest-dependent communities.

Objectives and Goals of the Green India Mission

The Green India Mission (GIM) seeks to address climate change by enhancing the quality and extent of India's forest cover while improving ecosystem services and supporting forest-dependent communities. Its core objectives are to improve forest quality and increase forest cover, promote aroforestry and social forestry, expand urban and peri-urban Forestry, conserve critical ecosystems, strengthen livelihoods of forest dependent communities, create sustainable employment opportunities through forest-based activities, eco-tourism, value-added forest products and encouraging the use of renewable energy sources. Moreover, it also aims to ensure food and water security, biodiversity conservation, carbon sequestration, enhance hydrological cycles. The ultimate vision of GIM is to increase India's forest and tree cover to one third of the entire land.

In Kerala, this project aims to eradicate invasive weed species like Lantana, Mikania and Cassia senna, which are proliferating in forest areas. In their place, native species such as bamboo, reeds, and indigenous trees would be planted as part of the mission.

The project in Kerala also seeks to establish small-scale enterprises with the participation of women, particularly tribal women, to facilitate the production and distribution of handicrafts made from bamboo and reeds. Further, it focuses on improving water conservation efficiency by implementing appropriate soil and water conservation measures. Agreements will also be forged with VSS/EDCs for effective forest fire prevention activities.

Furthermore, the initiative aims to mobilize 100,000 socially committed local green volunteers, who will play a crucial role in forest conservation and enhancing community livelihoods, thereby improving their overall quality of life.

Choosing Project Areas

Project areas are chosen based on a comprehensive landscape approach. These include the region's topography, forest cover and degree of land degradation. It also involves proximity to towns and cities, biodiversity levels and presence of unique ecosystems. Data on Below Poverty Line (BPL) families and tribal settlements are also considered.

Reviving Kerala's Forests

Launched in Kerala during the 2016–17 financial year, the Green India Mission has steadily expanded its footprint across the state. From 2016-17 to 2024-25, the initiative has utilized its full allocation of Rs 4,244.39 lakh, channeling funds into large-scale afforestation and eco-restoration efforts. During this time, these activities had covered an impressive 32,159 hectares of forest land. For 2025–26, an APO worth Rs 5,472 lakh has been approved, with Rs 2,735 lakh already released as part of the first central and state funding installment. The Green India Mission in Kerala is implemented across river basins of Neyyar, karamana, Vamanapuram, Ethikara, Kallada, Achancovil, pampa, Manimala, Muvattupuzha, Perfiyar, Pambar, Chalakkudy, Karuvanoor, Keecheri, Bharatapuzha, Bhavani, Kadalundi, Chaliyar, Kabani, Korapuzha, Kuttiyadi, Thalassery, Mahe, Ancharakandi, Valapattanam, Kuppam, Karingatti, Chandragiri, Mogral, Shiriya. ▪



Periyar Tiger Reserve

A Plastic-Free Success Story

Akhila Suresh



For years, people in villages surrounding the Periyar Tiger Reserve depended heavily on the forest for firewood, fodder and other daily needs. In some areas, the forest even became an informal dumping ground for household waste. But between 1996 and 1998, a quiet transformation began with the India Eco-Development Project with the support of local communities. Through sustained awareness campaigns and hands on engagement, the project helped reshape how villagers saw the forest. Members of newly formed Eco-Development Committees were encouraged to become active participants in conservation.

At the heart of this effort was the Vasantha Sena, an all-women conservation group. As part of their forest patrols, these women regularly collected plastic waste. Apart from this, these women collected plastic carry bags from incoming tourists at checkposts at Thekkady, where they offered handmade newspaper bags in return. Their actions helped keep the boat landing area and tourist zones visibly cleaner and more eco-friendly. At the time of the formation of Eco-Development Committees, plastic awareness became a key focus. To drive home the message, local artists from various EDCs came together to form Vanamppadi, a cultural group that used song, theatre and visual storytelling to stir public consciousness.

To encourage self-employment, several EDCs launched paper carry bag production units, providing sustainable alternatives to plastic while supporting livelihoods.This grassroots initiative has brought visible change to key pilgrimage destinations like Sabarimala and Mangaladevi, where pilgrims are now asked to surrender their plastic bags in exchange for eco-friendly paper ones. During the Sabarimala Pilgrimage season, it is Swami Ayyappan Poonkavanam

Restoration EDC under the Pampa Range, which successfully keeps the Sannidhanam plastic-free. Meanwhile, the Vasanthasena, Periyar Colony EDCs from the Periyar East Division play a key role on the route to Mangaladevi. At the gateway, these groups collect plastic bottles and hand out paper bags to visitors.

Aimed at eliminating plastic pollution in Periyar, the Periyar Tiger Reserve launched "Punarjani," a "Plastic-Free Campaign." This program engaged college and school students from local institutions and resorts to remove plastic from canals and also a protective grill was also installed at the canal's opening to prevent future accumulation. The PTR consistently spearheads plastic eradication, often in collaboration with other departments. In a joint effort with Kumily Grama Panchayat and the District Suchitwa Mission, two bottle collection booths have been placed at the main parking area for tourists entering the reserve. All the plastic is then handed over to the Panchayat's waste treatment plant as part of the "Green PTR" initiative.

The Periyar Tiger Reserve has significantly reduced plastic bottle consumption within its boundaries by providing ample drinking water facilities at all ecotourism locations. Furthermore, every community-based ecotourism program utilizes dedicated bags and flasks for food and beverages, ensuring that plastic waste doesn't permeate the heart of the reserve.

Once a month, children from local Nature Clubs, working alongside Eco-Development Committees (EDCs) clear plastic waste from the check post all the way to the boat landing. Important environmental dates throughout the year are marked with awareness programs and outreach programmes.

Apart from clearing plastic waste, EDC members also focus on weeding out invasive plants and restoring native habitats. Every month, a specific day is dedicated to a "Plastic-Free Campaign and on that day, EDC members, children of Nature Club and staff join together to remove plastic from the surrounding areas. The success of these varied programs highlights that the grand vision of "Zero Plastic" in Periyar Tiger Reserve is truly the outcome of a united community effort. ▪







Be Vigilant
Against Plastic



A Shanawaz IFS
Divisional Forest officer,
Thiruvanathapuram

The rhythm of seasons, nature's profound gifts to humanity and the very existence of our vital forests all depend on a harmonious and balanced environment. Uncontrolled shifts in our ecosystems dangerously weaken this balance, threatening the very survival of Earth itself. Our environment is a living mosaic, comprising animal and plant species, their diverse habitats and countless microorganisms. It's a framework where every living being, from the smallest microbe to the largest mammal, relies on another. This intricate interdependence is precisely why we observe World Environment Day globally on June 5 each year. For 2025, World Environment Day is issuing a powerful plea: Beat Plastic Pollution.

Plastics and Nature

Plastic pollution is fast becoming one of the most urgent threats to ecosystems around the world. It’s everywhere — floating in our oceans, buried in our soil and drifting through the air we breathe.

Among all forms of human-made waste, plastic stands out. The United Nations Environment Programme has put it bluntly that the planet is suffocating under the weight of plastic and we can no longer afford to ignore it.

It's almost as if humanity isn't just trying to control the planet, but the entire universe. In many ways, plastic has become a powerful, if alarming, symbol of this quest.

The eco-tourism centers in Thiruvananthapuram Forest Division have been at the forefront of effective plastic waste management for more than one and a half decade. Across tourist spots like Kallar, Mankayam and Ponmudi, solid and biodegradable waste is carefully sorted and then given to the 'Haritha Karma Sena' for further processing. On important days like Environment Day and Earth Day, these centers actively engage the public and VSS members in various conservation initiatives. This includes hands-on forest protection work, educational workshops, poster displays and the installation of informative signage.

One of the significant ways to reduce plastic pollution is through Reduce, Reuse and Recycle. By embracing these innovative methods, we can significantly cut down on plastic usage and pollution. The Thiruvananthapuram Division stands out for its unique and dedicated implementation of these vital '3 Rs'.

Each of us has a role to play in protecting our environment. We can protect our country and forests by making small changes in our daily lives, such as reducing plastic use, recycling bags and water bottles and conserving energy.







Importance of
Bringing Down Plastic Pollution

Protecting our planet's diverse wildlife is paramount. Plastic pollution poses a grave threat to both wild animals and their precious habitats. Alarmingly, countless creatures mistake plastic for food and feed on it. This can lead to severe injuries, suffocation, malnutrition and tragically, even death. Plastic waste chokes ecosystems, diminishing their ability to support the various species. We must act to safeguard these vital habitats and free our wildlife from the perilous grip of pollution.

The Thiruvananthapuram Division has made waves in environmental conservation with both the Kulathupuzha Museum and the Range Forest Office receiving the Green Protocol and Net Zero Carbon recognition from the Haritha Keralam Mission for 2024.

We all have a crucial role to play in protecting our environment. Simple changes in our daily lives can make a big difference in safeguarding our local communities and precious forests. By reducing plastic use, reusing bags and water bottles and conserving energy we can collectively contribute to a healthier planet. These small steps, when adopted by everyone, lead to a significant positive change. ▪

Sabarimala and Plastics

Ashok A S
Range Forest Officer, Goodrical



Sabarimala, India's renowned forest temple, is a place that draws over one crore pilgrims annually. Along the forest trails and in key areas like Nilakkal, Pamba and Sabarimala itself, countless plastic bottles and other plastic waste are discarded by pilgrims. To put it into perspective: if just one pilgrim visiting Sabarimala leaves behind a mere 10 grams of plastic, that collectively amounts to an astonishing 100,000 kilograms of plastic waste dumped in these sacred areas each year. The reality, however, is that the actual amount discarded is many times greater. Adding to this environmental strain, it's also common for devotees to mistakenly believe it's part of the ritual to abandon clothes in the Pamba River. All these leads to air, water and soil pollution, severely impacting the fragile ecosystem of this revered natural sanctuary.

The rainforests within the Ranni Forest Division and Periyar Tiger Reserve that are crucial ecosystems face a grave threat from plastic waste. This pollution directly imperils the delicate balance of these habitats and the very survival of their wildlife. Alarmingly, animals, including elephants, often mistake plastic bags containing food waste for sustenance. Ingesting these plastic laden meals can lead to severe health issues and tragically, even death for these magnificent creatures.

Managing the volume of discarded plastic at Sabarimala is nothing short of a monumental effort. In Pamba and Nilakkal, dedicated members of the 'Vishudhi Sena' collect all forms of waste, both organic and inorganic. Once gathered, this waste makes its way to Nilakkal, where it undergoes meticulous segregation. The inorganic materials, particularly plastics, are then channeled into an incinerator located right there in Nilakkal for proper disposal. Plastic waste is also routinely thrown into the forests lining the road from Laha to Chalakayam, creating an ongoing challenge for the environmental teams. In the Ranni Forest Division alone, over 50 Eco-Guards from local tribal communities are actively engaged in collecting plasdtic. The Plastic waste is then handed over to an agency based in Thiruvalla for scientific processing.

Collecting and managing waste at Sabarimala is no small task. But if we want lasting change, the real answer is to create awareness against bringing plastic into these forest stretches. A big part of the problem starts with tradition, specifically the 'irumudi kettu' (sacred bundle devotees carry on their pilgrimage). Many of the puja items inside are wrapped in plastic. A powerful way to address this is through widespread awareness campaigns using print and visual media at every pilgrim entry point during the season. These messages should encourage devotees to switch to eco-friendly materials. Then there's the issue of bottled water. By far, plastic bottles are the single largest contributor to waste in the area. The most practical solution? Install clean, free drinking water kiosks along the trekking paths. There is also a need for policy-level enforcement. When shops in Sabarimala, Pamba and Nilakkal are auctioned for the pilgrimage season, the contract terms should include a clear and enforceable ban on the sale of bottled water and food packaged in plastic. And while prevention is the heart of the solution, we can't ignore the plastic that still makes its way in. That's why it's equally important to build modern, scientific waste processing centers equipped to handle non-biodegradable materials efficiently and responsibly. ▪





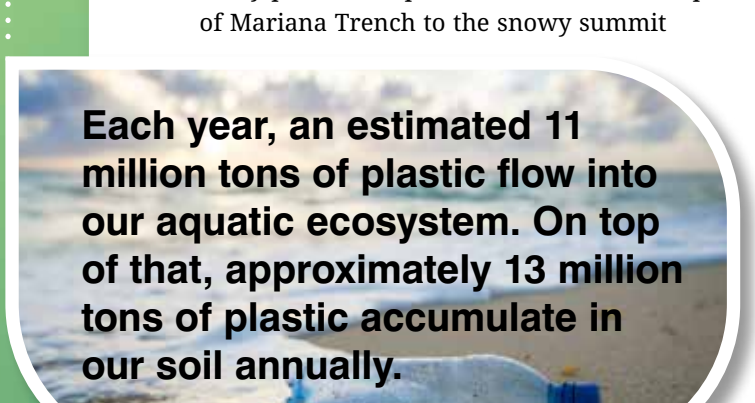


World Environment Day

World Environment Day 2025 is putting the spotlight on one of the planet's most urgent environmental challenges: plastic pollution. This year, the Republic of Korea hosted the global event, bringing together countries from around the world to take a firm stand against this growing crisis.

Harsh Reality of Plastic Pollution

Plastic waste has made its way into nearly every part of our planet. From the dark depths of Mariana Trench to the snowy summit of Mount Everest, traces of plastic are seen everywhere. It's in the water we drink, the food we eat and even in the air around us. Most concerning of all, scientists are now finding microplastics inside our bodies, a disturbing sign of just how far-reaching this problem has become.





World Environment Day

Since its launch in 1973, World Environment Day has become the United Nations' leading platform for raising awareness and inspiring action on environmental issues. Over the years, it has grown into a powerful movement that supports progress toward achieving environmental goals set out in the Sustainable Development Goals. Led by the United Nations Environment Programme (UNEP), the day is now marked in more than 150 countries each year, bringing people together across the globe to take part in protecting the planet we all share.

World Environment Day 2025

This year, World Environment Day is zeroing in on growing dangers of plastic pollution and how it's fueling three of the biggest challenges facing humanity: climate change, biodiversity loss and the rising tide of waste and pollution.



Each year, an estimated 11 million tons of plastic waste end up in our rivers, lakes and oceans. Plastics used in farming along with tiny microplastics from wastewater and landfills are seeping into the soil, silently poisoning the ground we depend on. The global cost of plastic pollution is estimated to fall between $300 and $600 billion every year.



Global Treaty to End Plastic Pollution

With countries working toward a groundbreaking global treaty to tackle plastic pollution, this year's World Environment Day carries even more weight. In November 2024, South Korea hosted the fifth round of talks focused on shaping this vital agreement. The discussions will continue in Geneva, Switzerland, from August 5 to 14, 2025, as world leaders strive to finalize a deal.

Host Nation: Republic of Korea



It is for the second time that the Republic of Korea is hosting World Environment Day. Over the past 28 years, South Korea has made impressive progress in areas like air and water quality, chemical safety and protection and restoration of natural ecosystems. The country is also leading the way in tackling plastic pollution across its entire life cycle -- from how it's made and used to how it's reused or disposed of. The country has implemented bold strategies to reduce waste at the source, promote creative reuse systems and accelerate the shift toward a circular economy. ▪



Butterflies

Nature's Health Indicators

Remya Raghavan
Range Forest Officer, Wayanad



Butterflies, with their dazzling colors and graceful flight, are more than just a beautiful part of nature -- they are vital to the health of our planet. Globally, there are more than 28,000 known species of butterflies, with around 80 per cent of them found in tropical regions.

Butterflies tend to thrive where the mix of plants, animals, landscape, soil and climate is just right. Their role goes far beyond aesthetics or symbolism. They are nature's health indicators. Butterflies are important pollinators. As they flutter from flower to flower in search of nectar, they help plants reproduce —transferring pollen and supporting biodiversity in the process. Some species even migrate across long distances, spreading pollen far and wide, which is essential for forest growth and plant diversity. While they don't carry seeds themselves, their contribution to the survival of seed-producing plants helps keep the cycle going. Butterflies also have a crucial place in the food chain. As both caterpillars and adults, they provide nourishment for birds, amphibians, reptiles and other creatures. Their presence supports ecosystem stability and even contributes to natural pest control, helping to keep plant-eating insect populations in check.

Butterflies do more than add beauty to the landscape. They serve as natural indicators of how healthy an environment really is. When their numbers decline, it's often a warning sign of deeper problems like pollution, habitat loss or climate change. By tracking butterfly populations and the variety of species in an area, scientists can get a clear picture of the overall well-being of forest ecosystems.

When certain butterfly species disappear from an area, one can see that some specific plants or trees they depend on are gone, or the microclimate those plants need has shifted. On the flip side, a sudden spike in one species might point to a rise in certain native plants or even invasive weeds. By paying attention to these delicate connections, we gain insight into the quiet but important changes taking place in nature.

> Scientists can get a clear picture of the overall well-being of forest ecosystems by tracking butterfly populations and the variety of species in an area.

Environmental shifts like climate change, pollution, deforestation and large-scale development have a big impact on butterfly numbers and diversity. As such, tracking these species can tell us a lot about how resilient a forest ecosystem really is. Take the Aralam Wildlife Sanctuary, for example. For over 25 years, scientists have been monitoring butterfly populations there.

Tucked away in the lush Western Ghats, Aralam Wildlife Sanctuary is a botanical treasure trove, home to an incredible range of habitats from dense evergreen and moist deciduous forests to shola groves





and open grasslands. But what truly sets Aralam apart is a magical natural phenomenon that unfolds between December and February. During these months, thousands of Albatross butterflies descend from the hills in flowing, ribbon-like streams, gliding along rivers, trails and clearings in a dazzling display. They gather in large groups on damp soil, engaging in a fascinating behavior known as "mud-puddling," where they absorb essential minerals from the ground. The 2025 butterfly survey recorded an astonishing 12,000 Albatross butterflies in the sanctuary. Alongside them, widespread presence of Plain Tiger butterflies (a Danainae species), adds to the region's vibrant diversity. One of the most striking past observations came in 2013, when over 400,000 butterflies — many from the Danainae group — were spotted clustered together in the Pothanplavu forest area. Of the 327 butterfly species found across Kerala, an impressive 266 have been documented in this single sanctuary alone, making it one of the most ecologically rich and significant butterfly habitats in the state.

Aralam Wildlife Sanctuary's exceptional butterfly diversity and the unique Albatross migration are clear indicators of a thriving ecosystem. Butterflies are crucial for maintaining this balance, acting as pollinators, food source for other creatures, natural pest controllers and even contributing to genetic variation in plants. However, butterfly populations are rapidly declining due to various environmental threats. Unscientific human activities, habitat destruction, widespread use of pesticides and a general lack of awareness about their importance are all contributing factors.

This makes it vital for the new generation to understand the significance of butterflies and actively participate in their conservation. Protecting butterflies isn't just about saving a few species; it's about safeguarding their entire habitat, including the plants they depend on. Therefore, a thoughtful approach, combining human intervention with traditional knowledge, is essential for preserving these creatures. By meticulously monitoring fluctuations in butterfly populations, we can ensure the sustainability of all living beings, including humans. ▪

Dhanukodi
A Memoir

Sreekumar Ramakrishnan
Content Editor



It's often said that life finds its true meaning when guided by ideals and values. In the professional realm, this sense of purpose can become a powerful driver of creativity and impact. Few embodied this better than Dhanukodi Pillai, the distinguished head of the Travancore Forest Department from 1922 to 1937. Born in Thiruvananthapuram in 1884, Pillai was the son of E. Ramalingam Pillai. After completing his education at Maharaja's College (now University College), he began his career in the Travancore Forest Department as a Ranger in 1908. Later he took advanced studies in forestry at the Oxford University and then headed to Germany for specialized training. After his return, he was appointed Assistant Conservator in 1914. In 1922, he became the head of the Travancore Forest Department, a position he held for 15 years. Remarkably, he was the only native officer to serve in this top role for such a long period. Under his leadership, the department underwent major reforms that helped shape modern forestry practices in Travancore.



Dhanukodi Pillai

Administrative Reforms

Dhanukodi Pillai's tenure saw not only key reforms but also forward-thinking initiatives that would lay the foundation for modern conservation and sustainable forestry in the region. One of his landmark decisions came in 1933 with the appointment of S.C.H. Robinson (Sidney Charles Herbert Robinson) as Travancore's first official Game Warden. This period also witnessed the declaration of Nellikampetty (now part of the Periyar region) as the first Game Reserve. Moreover, the Game Warden's office was relocated from Thiruvananthapuram to Peerumedu in 1934, placing it closer to critical forest regions and enabling more effective field-level monitoring. Another impactful development was the establishment of Arsenic - Copper - Chromite (ASCU) treatment section within the department. This initiative introduced a scientific approach to timber seasoning, enhancing the durability and structural integrity of wood used in construction. To lead this initiative, Dr. S. Kamesam, an expert from Visakhapatnam, was appointed as head of the Engineering Division. The Forest Department acquired Dr. Kamesam's patented technique for Rs. 15,000 following which a timber seasoning plant was established at Pallam in Kottayam. The wooden bridge at Thottappally Spillway in Alappuzha was one of the remarkable constructions. The plant operated successfully until 1940, supporting various public works, before it was eventually merged with the Public Works Department

(P.W.D.).

One of his notable contributions was the establishment of a Forest Rest House in Kottur near Thiruvananthapuram. Under his leadership, widespread plantation programs were also launched across Travancore. These included high-value species such as Sal, Sago palm, Cashew, Andaman Padauk, Trincomalee wood, Camphor trees, Bidiyila trees and Red Gum. Pillai was also a pioneer in introducing lac cultivation in the region. For this, he sent a Ranger to Ranchi, Jharkhand, for specialized training. He also established a Forest School in Naduvathumoozhi, Konni, in 1924, dedicated to training Forest Guards and preparing a skilled workforce to manage Travancore's forests.

Perhaps the most defining moment of Pillai's career came not from what he built, but from what he refused to destroy. In a time when few dared to defy authority, Pillai took a bold stand against Dewan C.P. Ramaswami Iyer, one of the most powerful

> Dhanakodi Pillai, who was the head of the Forest Department of Travancore from 1922 to 1937, was a visionary who ensured forest conservation and initiated several forest-related projects.

administrators of that era. The Diwan had issued an order to allocate forest land in Ranni for a place of worship—a move that Pillai firmly opposed. Despite the political risks, he revoked the order, standing by his principles and the responsibility entrusted to him as Conservator of Forests. This courageous act led to irreconcilable conflict with the Diwan. Eventually, Dhanukodi Pillai was forced to resign. He spent the remainder of his life in Shenkotta (present-day Sengottai), then part of Travancore, and passed away in 1960. ▪

S.C.H. Robinson



Dr. S. Kamesham



Dhanakodi Pillai's Vazhuthacaud residence.







As part of the World Environment Day, various activities were held at St. Mary's UP, Marayur, which was attended by School Headmistress Sister Beena, IB Teacher, Marayoor Range Forest Officer Abju K. Arun and Section Forest Officers Roy R and Shaiju Viswanathan.



In observance of World Environment Day, an environmental awareness class was held for the BSc Nursing students of Idukki Government Medical College. The session was led by B. Prasad Kumar, Assistant Wildlife Warden of Idukki with Joseph Varghese, BFO, conducting the class. Approximately 50 seed balls were also prepared by the students during the event.





World Environment Day was observed at Punnapra Mar Gregorios Arts & Science College under the auspices of Kollam Social Forestry Extension Unit. Forest Department officials, college faculty and students collectively participated in planting saplings on the college campus. Attendees included Rev. Fr. Cheriyan Karikkombil and staff from the Kollam Social Forestry Extension Unit.









To commemorate World Environment Day, a clean-up drive was organized by the Thannithode Forest Protection Committee, operating under the Thannithode Forest Station. As part of the initiative, plastic waste was removed from both sides of the Mozhi-Mundomoozhi road, contributing to a cleaner and healthier environment.





Kollam Social Forestry Extension Unit organized an environmental awareness class for Zoology students and Bhoomitrasena members at Chempazhanthy S.N. College, Thiruvananthapuram, in observance of World Environment Day. The event saw participation of Dr. Leji J., Head of the Zoology Department at the college, Retired Deputy Conservator of Forests S. Dinesh, Zoology Department faculty Preethi and staff from the Kollam Social Forestry Extension Unit.



On the occasion of World Environment Day, various programs were organized across the state under the auspices of the Forest Department. Many people, including school and college students, participated in the programs.



Marayoor Sandalwood Division organized a World Environment Day event at Kanthalloor Anjunad IHRD College. Marayoor Range Forest Officer Abju K. Arun, College Principal Suji P. Thelakkatt, NSS Volunteer ; Kumari Indu R, screenwriter E.J. Joseph and Balamurugan K were presen.



The Kollam Social Forestry Extension Unit organized an environmental awareness class at Mayyanad Higher Secondary School in observance of World Environment Day.



Seed Balls were prepared by the students of kunjathumma B. Ed. College and PTM-HSS School, Kodiyathoor. They prepared the seed balls under the guidance of Kodumpuzha Forest station, Nilamboor Division, Edavanna range. As many as 3000 seed balls were prepared.



A class on "Mission Solar Fencing" was organized at the Chayppankuzhi Forest Station within the Periyar Range. The session was led by Deputy Range Officer M.S. Suresh Kumar, Range Coordinator M.E. Muhammed Nash (SFO) and master trainers P.K. Joby (BFO) and Sneha Sojan (BFO).





Thalir Library

Block Panchayat president Justic Boby inaugurated Thalir Library, which is being established under North Wayanad Development Agency, Makkimala Adivasi Vana Samrakshana Samithi. Thavinjal panchayat president Elsi Joy, North Wayanad DFO Martin, Panchami Book stall representative Jesudas, Varapuzha Range forest officer Begur Ranjith Kumar, Thalir Library president Sudhakaran were present among others.



As part of Mission Sarpa, staff from the Bandadukka Section inspected the premises of Manimoola Government L.P. School.



Staff from the Gurunathanmannu Forest Station in the Vadaserikkara Range carrying out maintenance work on the solar fencing in Poochakkulam and Thazhe Poochakkulam. They restored the fencing to full operational status.





The successfully repaired fencing in the Pavithrankayam-Vattakayam section, which was damaged by strong winds causing tree branches to break and fall. Section staff and watchers worked together to restore it to full operation.

'REACH' Portal
for Forest Research Permissions

Starting July 1, 2025, researchers seeking permission to conduct studies in Kerala's forest areas can only apply through a new digital platform: REACH. Launched by the Kerala Forest Department, this online system replaces the older process of direct and email-based applications, aiming to simplify and streamline access to forest research permits.

The REACH portal is available via the e-services section of the Forest Department's official website: https://forest.kerala.gov.in.

Getting Started with REACH

Register Your Account

First-time users need to sign up by entering basic details such as name, phone number, email ID, and creating a username and password.

Submit a New Application

Once registered, you can log in and begin submitting new research applications directly through the portal.

Manage and Track Applications

The platform also lets users edit submitted applications, upload additional documents if needed, and track the current status of the requests.

Researchers must also upload personal information, detailed description of the research project and all relevant supporting documents. Once the application is reviewed and approved, the permission order can be downloaded directly from the portal.

Applicants will also receive real-time status updates via SMS and email, keeping them informed throughout the process.

With REACH, accessing Kerala's green laboratories has become smarter and more efficient. ■





50 years of Ervaikulam National Park

Forest Department Plans Extensive Celebrations

Once known as Hamilton's Plateau during the British Raj, the landscape that now forms Eravikulam National Park is celebrating 50 years of committed conservation. Spread across 97 square kilometers, the park sits in a biodiversity hotspot, bordered by the Anamalai Tiger Reserve in Tamil Nadu, Marayoor Sandalwood Forest, Mankulam, Munnar Division and Chinnar Wildlife Sanctuary. It also houses Anamudi (2,695 meters), the highest peak in peninsular south of the Himalayas.

The transformation to National Park began in 1971, when the Kerala government acquired the region and declared it a wildlife sanctuary in 1975. Just three years later, in 1978, Eravikulam was officially designated a National Park.

As part of the celebrations, the Kerala Forest Department has launched a year-long celebration with 50 unique programs, blending science, education, culture and community engagement. Among the most significant initiatives is the first-ever comprehensive, state-level census of the Nilgiri Tahr, carried out in 2025. Cultural and educational programs, Webinars and expert seminars, Training sessions for forest staff, guides, and local stakeholders, short film festival showcasing the park's beauty, challenges and conservation stories, Public competitions, Eco Run, reunion of retired forest officials, Habitat restoration projects, Green School Quizzes, Special nature camps for students from 50 schools in Munnar-region are all planned as part of the celebrations. ■

Q&A

1. The earlier project envisioned and implemented by the state government to remove plastic and other waste from areas adjacent to forest paths in Kerala.
2. Significance of Polylactic Acid (PLA)
3. Artificial synthetic polymer discovered by DuPont chemists in 1930
4. Tiny, insoluble substances derived from plastic degradation (less than 5mm) that are a threat to human beings
5. Global organization working towards marine waste eradication
6. The North Pacific region with 45,000 to 129,000 metric tons of plastic across 1.6 million sq km, as identified by Ocean Cleanup
7. The Photographer of 2016 Wildlife Photographer of the Year finalist image, showing a seahorse with a Q-tip, highlighting marine pollution



8. Special characteristic of Ideonella sakaiensis, a bacterium discovered in Japan
9. Kerala's project for segregated solid waste collection and recycling from homes via local self-governing bodies
10. The world's first complete plastic

Answers: Page 50

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



School Forestry 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:

The sea I know

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:
August 31, 2025



Q&A

ANSWERS

1. Project Green Grass
2. It's a bioplastic, specifically a thermoplastic polyester, which is biodegradable
3. Nylon
4. Microplastics
5. The Ocean Cleanup
6. The Great Pacific Garbage Patch



7. Justin Hofman



8. Enzymes PETase and MHETase enable the bacterium to plastic
9. Haritha Keralam Mission



10. Bakelite

പാമ്പിനെ ഭയക്കണ്ടതില്ല

രക്ഷയ്ക്ക് ഇനി സർപ്പ ആപ്

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

ARANYAM - Forest Wildlife Environment Magazine
Monthly | 2025 June | Vol. 45 | Issue 06
RNI NO. 44566/86
KL/TV/(S)/397/2021-23
Date of Publication: 2025 June 05
Price : ₹50

കാടിന്റെ നന്മ
വനാശ്രിത സമൂഹങ്ങളിലൂടെ
ജനങ്ങളിലേക്ക് !



ആദിവാസികൾ
ശേഖരിച്ചു തയ്യാറാക്കിയ
വനോൽപ്പന്നങ്ങൾ
ഓൺലൈനിലും വാങ്ങാം
vanasree.in
Scan & Buy Online
Delivery Partner

കേരള വനം വകുപ്പ്
വനശ്രീ
വനാശ്രിതരുടെ മുഖശ്രീ
ഒരു സംസ്ഥാന വന വികസന ഏജൻസി സംരംഭം

Printed and Published by Rajesh Raveendran IFS., Chief Editor, Principal Chief Conservator of Forests & Head of Forest Force, Forest HeadQuarters, Vazhuthacaud, Thiruvananthapuram, Kerala, India on behalf of Kerala Forest and Wildlife Department. Printed at Kerala Books & Publishing Society, Kakkanad, Kochi, Kerala