

BIOINVASION

EIACP Newsletter on Biological Invasions

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LIFE
Lifestyle for
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Cover Page

Photo | *Trachemys scripta elegans* |Red-eared Slider Turtle

Credit| Dr. Maya Mahajan

Drawing

Lantana camara

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From the Coordinator's desk

Ministry of Environment, Forest and Climate Change's (MOEFCC) Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP) Resource Partner at Amrita Vishwa Vidyapeetham is established to disseminate scientific, technical, and semi-technical information on various issues related to biological invasion (Invasive Alien Species) and conduct related research and extension activities. Some of the objectives of the EIACP center (Invasive Alien Species) are:

1. To promote, implement and coordinate Green Skill Development Programme (GSDP), an initiative to skill youth in environment, forest and wildlife sectors and enable them to be self-employed.
2. To implement and coordinate National Environment Survey (NES) a Grid-based Resource Information and Decision Support System (GRIDSS) for sustainable management of natural resources to fill in data gaps with respect to various environmental parameters such as emission inventory and pollution; forest and wildlife (flora and fauna); wetlands; rivers and other water bodies; public health, etc.
3. To implement and coordinate a community driven Environmentally Sustainable Village Programme (CESVP) with the objective of mobilizing communities on environmental issues, creating decentralized models of development to empower local communities and build an awareness driven atmosphere in villages to adopt environmentally sustainable practices at the community level.
4. To build a repository and dissemination center in Environmental Science, Information and Management (ESIM).
5. To support and promote research, development, and innovation in ESIM.
6. To promote national cooperation and liaise with agencies concerned for exchange of environment and biological invasion related information.

Through this newsletter, our aim is to raise awareness about the impacts of biological invasion on natural ecosystems among different target groups, such as school children, college students, the scientific community, the general public, and policymakers.

Dr Maya Mahajan
Coordinator EIACP RP

Turtle Takeover:

Unraveling the Red Eared Slider Invasion in India

Nikhila K | Information Officer | EIACP RP |
Amrita Vishwa Vidyapeetham, Coimbatore



Taxonomy

Kingdom: Animalia

Phylum: Chordata

Sub phylum: Vertebrata

Class: Reptilia

Order: Testudines

Family: Emydidae

Genus: *Trachemys*

Species: *Trachemys scripta elegans*

“As you stroll through the pet shop, a small aquarium catches your eye. Inside, a tiny turtle paddles around, its bright shell shimmering under the lights. Its curious eyes seem to meet yours through the glass, inviting you to take a closer look. With its striking red markings and graceful movements, this little turtle is hard to resist. Watching it glide effortlessly through the water, you can't help but feel drawn to its playful nature. The Red Eared Slider isn't just a pretty face to pet, it is a serious threat to be taken care of!

What is an invasive species?

The species that effectively expand their area outside their natural range, frequently due to human-mediated actions, and pose a danger to the local ecosystems and biodiversity are known as invasive alien species (IAS) (Lososová et al., 2021). Apart from their environmental effects, such as resource extraction, they also pose risks to health and the economy (Aravind et al., 2023). Most of these incursions are caused by humans, either intentionally or unintentionally. In recent years, the Pet trade has emerged as the major corridor of biological invasion, the

red-eared slider turtle being the latest entry.

The red-eared slider turtle is one of the top 100 most invasive species on the IUCN list and is probably the most invasive turtle in the world (Lowe et al., 2000). The fact that naturalized populations of this turtle have been found in 73 countries and are banned in more than 30 countries worldwide reveal its strong invasive potential. Emerging from the Mississippi River and the Gulf of Mexico, they began posing a worldwide threat from 1989 to 1997 as the local people shipped more than 52 million Red-eared Sliders to

various nations, particularly China, as reported by the International Union for Conservation of Nature's Global Invasive Species Database.



Source: thesprucepets.com

Red Eared Slider Turtle

The Red-Eared Slider Turtle, with its vibrant red markings and distinctive yellow stripes, is a familiar sight in pet stores around the world. Its attractive color, patterns, enthusiastic behavior, gliding movements, lower price, and initial tiny size will conquer the minds of everyone, resulting in bringing them as pets to your home. The other side of the story starts when they eagerly consume food and attain maximum size quickly. Due to the difficulties of keeping them in a small aquarium, their increased craving for food, frequent contamination of the aquarium water, aggressive behavior, and tendency to escape into the wild and nearby waterbodies, most pet owners eventually reach the point where they deliberately gave up these turtles to the wild. And this creates the beginning of a chain of tragedies.

Originally native to the freshwater habitats of the southern United States, this species has traversed continents

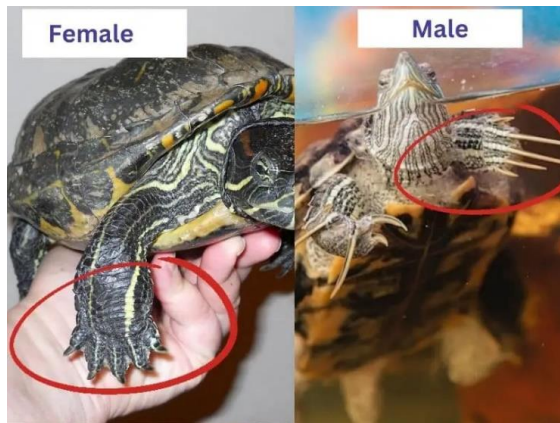
and established itself as a formidable invasive presence in various regions, including India. What began as a fascination with these charming reptiles has evolved into a complex ecological challenge, as the Red-Eared Slider's adaptability and prolific breeding habits have enabled it to thrive in non-native environments.

In India, the introduction of Red-Eared Slider Turtles has triggered a cascade of ecological disruptions, threatening the delicate balance of local ecosystems. From the bustling waterways of urban centers to the serene ponds of rural landscapes, these invaders have infiltrated diverse habitats, out-competing native species and reshaping ecological dynamics. As their numbers continue to swell, concerns about the long-term impacts on biodiversity and ecosystem stability have escalated, prompting urgent calls for intervention and management.

Morphology of Red Eared Slider Turtle

The existence of two striking red patches in place of ears, on the two sides of head has given its name "Red-eared slider turtle". The turtle's head, throat, limbs, and tail feature olive to brown colouring with yellow streaks running through them. The shell consists of two parts; the upper carapace and the lower plastron. The carapace is oval and flattened (particularly in males), with a slight keel that is more obvious in the young. Depending on the turtle's age, its carapace varies in different colours.

Typically, it has a dark green background with wildly varied bright and dark marks. This species' carapace can develop to be more than 40 cm (16 in) long, although the normal length is 15 to 20 cm (6 to 8 in).



The plastron is consistently pale yellow, with the majority of scutes having black, paired, asymmetrical patterns in the center. The pattern of the plastron is quite random. There are tiny, erratic yellow lines on the green head, legs, and tail. These stripes and patterns cover the whole shell, which helps to conceal oneself.

Red-eared sliders exhibit sexual dimorphism; usually, females are larger than males. While females have a flat plastron, males possess a concave plastron. The longer claws in the front feet of males than females are also a way of exhibiting sexual dimorphism. In addition, the tail is thicker and longer in males, and the cloacal opening is situated ahead of the carapace edge. Whereas in females the tail is short, and the cloacal opening is just below the carapace edge.

They normally live between 20 and 30 years, although some might live for more than 70 years. They have a reduced life expectancy when held captive. The quality of their living environment has a significant impact on their longevity and health.

INVASION IN INDIA

The invasion of the Red-Eared Slider Turtle (*Trachemys scripta elegans*) in India has been characterized by a series of introductions and subsequent establishment in various freshwater habitats across the country. The timeline of their invasion traces back to the mid-20th century when these turtles were imported for the pet trade. Smugglers acquired them unlawfully from abroad and sold them through pet stores and street vendors. Pupins (2007) was the first to report the species' existence in India, but no further information was supplied. Initially confined to captivity, some individuals were released or escaped into the wild, laying the groundwork for their spread beyond their native range. Red eared sliders are known to be present widely in the states of Gujarat, Maharashtra, Telangana, Karnataka, Chandigarh, West Bengal, Goa, Rajasthan and recently in Kerala too after the flood of 2018.

Since their introduction, Red-Eared Sliders have demonstrated remarkable adaptability to diverse environmental conditions, enabling them to thrive in a wide range of aquatic ecosystems

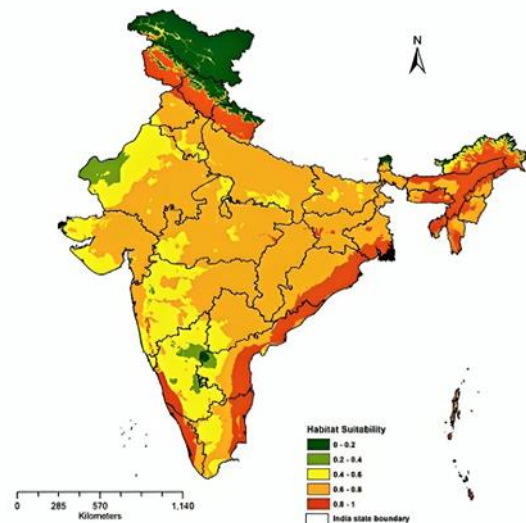
throughout India. From urban ponds and lakes to rural water bodies and irrigation canals, these invasive turtles have found ample opportunities to establish breeding populations and expand their range. Their invasion has been facilitated by several factors, including their ability to reproduce rapidly, with females capable of laying multiple clutches of eggs each year. Furthermore, their omnivorous diet and generalist feeding behavior allow them to exploit a variety of food sources, including aquatic plants, invertebrates, and small vertebrates, giving them a competitive edge over native species.



The spread of Red-Eared Slider Turtles in India has been fueled not only by accidental releases or escapes but also by deliberate introductions by well-meaning individuals unaware of the potential ecological consequences. As a result, these invasive turtles have become widely distributed across the country, establishing self-sustaining populations and exerting pressure on native species through competition for resources and habitat alteration.

The invasion of Red-Eared Slider Turtles in India poses a significant threat to

native biodiversity and ecosystem functioning. Their presence can lead to declines in native turtle populations through direct competition, predation, and habitat degradation. Furthermore, their ability to hybridize with closely related native species raises concerns about genetic introgression and loss of genetic diversity.



Predicted potential distribution of *Trachemys scripta elegans* under current scenario in India ((Aravind et al., 2023)

Efforts to address the invasion of Red-Eared Slider Turtles in India involve a combination of measures, including monitoring and surveillance, public education and outreach, habitat restoration, and targeted management interventions such as trapping and removal programs. However, the pervasive nature of this invasive species underscores the importance of proactive measures to prevent further spread and minimize its impacts on India's rich aquatic ecosystems.

IMPACT ON NATIVE ECOSYSTEM

The invasion of Red-Eared Slider Turtles (*Trachemys scripta elegans*) in India has sparked concerns about its repercussions on native ecosystems. As these invasive turtles establish themselves in freshwater habitats across the country, their presence poses a multifaceted threat to indigenous flora and fauna.

1. Competition with Native Turtles:

One of the primary ecological challenges posed by Red-Eared Slider Turtles is their competition with native turtle species for food and nesting resources. As omnivorous opportunists, Red-Eared Sliders exploit a wide range of food sources, including aquatic plants, invertebrates, and small vertebrates. This voracious appetite often leads to intensified competition with native turtles, particularly for limited resources such as aquatic vegetation and suitable nesting sites. The resulting imbalance in resource availability can adversely affect the reproductive success and population dynamics of native turtle species, ultimately threatening their long-term survival.

2. Predation on Native Aquatic Fauna:

In addition to competition, Red-Eared Slider Turtles exert pressure on native ecosystems through predation on indigenous aquatic fauna. With a diverse diet that includes fish,

amphibians, crustaceans, and mollusks, these invasive turtles can significantly impact local biodiversity. Their indiscriminate feeding habits and efficient hunting strategies make them formidable predators, capable of decimating populations of native species and disrupting ecological balance. The loss of key prey species can have cascading effects on food webs, leading to further destabilization of aquatic ecosystems and compromising overall ecosystem health.

3. Alteration of Habitats:

The presence of Red-Eared Slider Turtles also contributes to habitat alteration through their feeding behavior and nesting activities. As bottom-dwelling omnivores, these turtles disturb sediment and vegetation while foraging, causing physical disturbance to aquatic habitats. This disruption can lead to increased turbidity, sedimentation, and nutrient loading, negatively impacting water quality and ecosystem function. Furthermore, their nesting activities, characterized by the excavation of nests in shoreline vegetation or sandy substrates, can destabilize shoreline habitats and exacerbate erosion. The cumulative effect of these alterations can result in degraded habitat quality, loss of biodiversity, and diminished ecological resilience.

THREATS TO BIODIVERSITY

As the Red-Eared Slider Turtle (*Trachemys scripta elegans*) continues to establish itself as a pervasive invasive species in ecosystems worldwide, concerns about its impact on biodiversity have escalated. This includes the following:

1. Disruption of Food Webs and Ecological Interactions:

One of the most significant threats posed by Red-Eared Slider Turtles to biodiversity is the disruption of food webs and ecological interactions within freshwater ecosystems. As opportunistic omnivores, these invasive turtles exert pressure on native flora and fauna by consuming a wide variety of food resources, including aquatic plants, invertebrates, and small vertebrates. This voracious appetite can lead to the overexploitation of prey species and the depletion of critical resources, triggering cascading effects throughout the food web. Disruptions to trophic dynamics can result in altered community structures, reduced biodiversity, and compromised ecosystem stability, ultimately jeopardizing the resilience and functioning of native ecosystems.

2. Potential Transmission of Diseases to Native Species:

In addition to direct predation and competition, Red-Eared Slider Turtles

pose a significant risk of transmitting diseases to native species. As carriers of various pathogens and parasites, these invasive turtles can serve as reservoirs for infectious agents that may affect susceptible native wildlife. The proximity and interactions between Red-Eared Sliders and native species in shared habitats facilitate the spread of diseases, amplifying the threat to biodiversity. Furthermore, the introduction of novel pathogens by invasive turtles can lead to outbreaks of disease among native populations, causing population declines and increasing vulnerability to other stressors.

3. Genetic Hybridization with Native Turtle Species:

Another emerging threat associated with Red-Eared Slider Turtles is the potential for genetic hybridization with native turtle species, leading to the loss of genetic diversity and the homogenization of gene pools. There are reported cases of genetic hybridization of introduced Red-Eared Slider Turtles with other taxa of *Trachemys* in different parts of the United States and Mexico (Forstner et al., 2014, Parham et al., 2013, Seidel et al., 1999, Palmer and Braswell, 1995, Mitchell, 1994). Interspecies mating between Red-Eared Sliders and native turtles can result in hybrid offspring that possess intermediate traits and genetic

combinations. This genetic introgression can erode the distinctiveness of native populations and weaken their adaptive potential to environmental changes. Moreover, hybridization may lead to the displacement of purebred native species through competitive exclusion or reduced fitness, further exacerbating the decline of biodiversity. Even though these cases are in other parts of the world where closely related species of Red-Eared Slider Turtles exists, still this remains as a serious threat to be taken care of, because genetic variability is a highly important factor for an invasive species to widen its range. In a region like India where aquatic ecosystem plays a crucial role in all environmental, economic and climatic aspects, foreseeing this threat and taking advance actions are becoming the need of the hour.

ECONOMIC AND SOCIAL IMPLICATIONS

1. Economic Costs Associated with Invasive Species Management:

The invasion of Red-Eared Slider Turtles in India imposes significant economic burdens on both government agencies and local communities tasked with managing their impacts. The costs associated with invasive species management include surveillance and monitoring efforts to track the spread of Red-Eared Sliders, research initiatives to understand their ecological impacts, and

implementation of control and eradication measures such as trapping and removal programs. In economically weaker countries like India, where financial resources are limited and competing priorities abound, the allocation of funds for invasive species management can strain already constrained budgets, diverting resources away from other critical conservation and development initiatives.

Furthermore, the economic costs extend beyond direct management efforts to encompass indirect impacts on sectors such as agriculture, fisheries, and tourism. Red-Eared Slider Turtles can negatively affect agricultural productivity by damaging crops and irrigation infrastructure, leading to financial losses for farmers. In fisheries, competition with native species for food resources can result in reduced catch yields and income for fisherfolk reliant on freshwater resources. Additionally, the presence of invasive turtles in recreational water bodies can deter tourists and outdoor enthusiasts, leading to declines in tourism revenue for local economies.

2. Social Consequences and Conflicts with Human Activities:

In addition to economic costs, the invasion of Red-Eared Slider Turtles in India gives rise to various social consequences, including conflicts with human activities such as fishing and

agriculture. Competition with native species for food and habitat resources can escalate tensions between local communities and invasive turtle populations, particularly among fisherfolk and farmers who rely on freshwater ecosystems for their livelihoods. Conflicts may arise as communities' grapple with the impacts of invasive turtles on their traditional practices and economic well-being, leading to disputes over resource use and allocation.

Furthermore, the presence of Red-Eared Slider Turtles in water bodies frequented by recreational users can result in conflicts over access and usage rights. Anglers, boaters, and swimmers may find themselves at odds with conservationists and wildlife managers seeking to control invasive species populations, highlighting the need for effective communication and conflict resolution strategies.

3. Human health hazards:

It is also well known that invasive turtle species, like *T. scripta*, are likely to harbor several parasites and diseases, including *Salmonella* (Vyas, 2020). Human populations become infected with pathogenic bacteria that cause fever, severe stomachaches, and diarrhea when there is *salmonella* contamination in the water. As reported by Mermin et al. (2004), handling pet reptiles, including *T. scripta*, ended up resulting in an annual infection rate of around 1.4 million

Americans with Salmonella. Compared to mammals and birds, captive reptiles confined to houses are known to carry larger percentages of Salmonella, making them favorable carriers (Goppee et al., 2000). In addition, a recent investigation reveals that the bacteria that causes cryptosporidiosis, *Cryptosporidium parvum*, is present in RES in Poland (Rzeżutka et al., 2020).

CONSERVATION EFFORTS AND MANAGEMENT STRATEGIES

1. Measures to Control Spread: Trapping and Removal Programs

Trapping and removal programs represent one of the primary strategies employed to control the spread of Red-Eared Slider Turtles. These programs involve the deployment of traps and other capture devices in targeted locations known to be inhabited by invasive turtle populations. Traps are designed to capture turtles while minimizing harm to native species and non-target organisms. Once captured, turtles are removed from the environment and either relocated to suitable habitats away from sensitive ecosystems or euthanized in cases where relocation is not feasible. In India, trapping and removal programs are typically conducted in collaboration with local conservation organizations, government agencies, and community volunteers. These efforts are often supported by scientific research to

identify high-priority areas for intervention and optimize trapping strategies for maximum effectiveness. By systematically removing invasive turtles from key habitats, trapping and removal programs aim to reduce population densities and limit their impact on native biodiversity.

2. Public Awareness Campaigns to Discourage Release of Pet Turtles

In addition to direct management actions, public awareness campaigns play a crucial role in discouraging the release of pet turtles into the wild and raising awareness about the ecological impacts of invasive species. The outreach initiatives should target pet owners, pet stores, and the general public, emphasizing the importance of responsible pet ownership and the potential consequences of releasing non-native species into natural habitats.

These campaigns employ various communication channels, including social media, educational workshops, and informational materials distributed in local communities. By fostering a culture of responsible stewardship and promoting alternatives to releasing unwanted pets, public awareness campaigns aim to reduce the influx of Red-Eared Slider Turtles into natural ecosystems and prevent further spread of invasive species.

3. Research Initiatives to Understand Ecology and Behaviour

Research initiatives play a critical role in informing conservation and management strategies for invasive turtle populations. Scientists and wildlife biologists conduct studies to better understand the ecology, behaviour, and population dynamics of Red-Eared Slider Turtles in the region. These studies encompass a wide range of topics, including habitat preferences, reproductive biology, diet composition, and interactions with native species. Through field surveys, telemetry studies, and laboratory experiments, researchers gather data to elucidate the factors driving the success of invasive turtles and identify opportunities for intervention. This scientific knowledge forms the basis for evidence-based management decisions and helps guide the development of targeted conservation strategies tailored to the unique ecological context of India.

4. Regulations on Pet trade and strengthening Quarantine centres

The most crucial step in the management of RES in India is legally restricting their establishment through the pet trade. By imposing stricter regulations on the import, sale, and ownership of exotic species, governments can mitigate the risk of invasive species disrupting local ecosystems. Additionally, the establishment of quarantine centers plays

a crucial role in this effort. These centers serve as checkpoints where imported animals undergo thorough examination and quarantine periods to ensure they are free from diseases and parasites, thereby preventing the spread of potential invaders. In India, enhancing legislative frameworks and investing in quarantine facilities are pivotal steps towards safeguarding biodiversity and ecological balance against the threat posed by invasive species introduced through the pet trade. The fact that RES is not registered as an Invasive Alien Species (IAS) in India, due to the lack of proper data makes this scenario worse.

CONCLUSION

The invasion of the Red-Eared Slider Turtle (*Trachemys scripta elegans*) in India represents a significant ecological threat that demands urgent attention and concerted action. Throughout this article, we have explored the multifaceted impacts of invasive turtles on native ecosystems, from competition with native species for resources to disruptions of food webs and potential transmission of diseases. The Red-Eared Slider's invasive potential extends beyond ecological consequences to encompass economic costs, social conflicts, and challenges to human well-being, particularly in a region like India, where biodiversity and livelihoods are closely intertwined.

Red-Eared Slider Turtle poses a grave invasive threat in India, with its adaptability, reproductive prowess, and capacity for ecological disruption amplifying its impact on native biodiversity. From outcompeting native turtles for food and nesting resources to potentially spreading diseases and hybridizing with indigenous species, the invasive presence of Red-Eared Sliders undermines the integrity and resilience of India's freshwater ecosystems. In a region like India, where native turtles are continuously facing various abiotic and biotic stress (mostly due to human activities), the invasion of an entirely dangerous turtle will add more to their problem.

However, there is hope on the horizon. Proactive management and conservation efforts hold the key to mitigating the impacts of invasive turtles and safeguarding native ecosystems and biodiversity. By implementing measures such as trapping and removal programs, public awareness campaigns to discourage pet releases, and research initiatives to enhance our understanding of invasive turtle populations, India can take decisive steps towards addressing this ecological challenge. It is imperative that stakeholders, including government agencies, conservation organizations, researchers, and local communities, collaborate effectively to develop and implement integrated management

strategies tailored to the unique context of India's diverse ecosystems. Through collective action and sustained commitment to conservation, we can strive to protect native biodiversity, restore ecological balance, and ensure a sustainable future for India's natural heritage.

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WILDLIFE & ENVIRONMENT

Invasive south red-eared slider turtle poses threat to Indian biodiversity

This turtle is very small and easy to maintain and these features made them popular pets

By Himanshu Nibhare
Published: Thursday 28 September 2022



Red-eared slider turtle breeds faster compared to other local turtle varieties. Photo: iStock

Forest dept to check fish shops for illegally selling turtles as pets


Wildlife enthusiasts and people with certain religious beliefs are allegedly buying these turtles in violation of law.

Feb 05, 2023 08:46 PM IST

Story continues below advertisement

Empower your store with a modern retail POS

PRAYAGRAJ The forest department has decided to launch an inspection drive as it has come to its notice that aquariums and exotic fish shops are selling turtles as pets. Wildlife enthusiasts and people with certain religious beliefs are allegedly buying these turtles in violation of law.



Beware of this cute red-eared turtle

After the *Shrek* movies, an alien creature that checked the *Avatar* Parrot ranks at *Parashure* but most her invasive invasion is

The exotic invasive species can finish off a wide range of aquatic species.

NEWS | BUSINESS | SPORTS | ENTERTAINMENT | AUTO | TV

This story is from December 15, 2021

Mumbai: Over 60 Exotic Turtles, Marine Pets Abandoned In Last Six Months, Raising Concern

NEWS | BUSINESS | SPORTS | ENTERTAINMENT | AUTO | TV

A shocking statistic that nearly 60 exotic turtles - mainly the red-eared sliders - have been callously abandoned by the pet owners.

Mumbai: A shocking statistic that nearly 60 exotic turtles - mainly the red-eared sliders - have been callously abandoned by the pet

NEWS | BUSINESS | SPORTS | ENTERTAINMENT | AUTO | TV

Native Indian turtles face U.S. slider threat across Northeast

Herpetologists have warned that the invasive red-eared slider, released in natural water bodies by people who keep them as 'cute' pets, could turn nasty for 29 native species of turtles and tortoises.

NEWS | BUSINESS | SPORTS | ENTERTAINMENT | AUTO | TV

Chennai: This cute looking turtle is so tiny it can fit into a match box. Much revered in the pet market, red-eared turtles locate among children across the world after the *Shrek* movie series. These turtles have invaded Chennai's lakes in Velupuram, Perambalur and Paluram as well as in Chengalpet and other localities. Experts believe some pet owners must have been in water bodies. About 12 were rescued in the past two years and taken to the Gandy Children's Park.

NEWS | BUSINESS | SPORTS | ENTERTAINMENT | AUTO | TV

Scientists and experts say they are a threat not just to the aquatic species due to their aggressive nature but also to humans. 17 Indian tortoises such as the Galapagos and Galapagos that can be kept as pets and can cause death. Native to southern US or northern Mexico, these freshwater turtles are known for their red marks that look like ears.

THE TIMES OF INDIA

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Newspaper articles on RES Invasion

India needs trade regulatory policies to manage invasive alien species

Dr Achyut Kumar Banerjee | Assistant Professor |
School of Arts and Sciences | Azim Premji University |
Bhopal, Madhya Pradesh, India



Trading and biological invasion

For thousands of years, international trade has been an indispensable part of human society. International trade started to rise at an unprecedented rate since the onset of globalization in the 19th century. With each round of globalization¹ (also known as globalization waves 1 to 4), international trade has become more intensified.

Human preferences for certain plant species for foods, ornamental use, forestry, soil improvement, and other purposes contribute to many alien species introductions outside their native ranges. The surge of international trade has opened new channels for these species to spread. In fact, the number of new occurrences of alien species recorded each year worldwide has increased² almost 20-fold since the start of the 19th century. It is expected that with the growth in international trade, the likelihood of alien species introduction will also increase.

Some of these introduced alien species become invasive³ when they escape

human control and establish, survive, and reproduce in the wild of their own, potentially causing species extinction, modifying ecosystem processes, and acting as disease vectors. Invasion of alien species is one of the most important global problems experienced by ecosystems and is ecologically and economically of grave concern. Consumer preference for alien species for certain traits (like hardiness, showy flowers, exotic nature, greater number of uses) often leads to a longer presence of these species in the market, which, in turn, increases the invasion probability of the alien species by many folds.



Co-occurrence of two invasive alien plant species - *Lantana camara* and *Mikania micrantha*. Observed in Kolkata, West Bengal. | © A. K. Banerjee

Governments often implement international and domestic trading regulations to reduce the risk of the introduction and spread of alien species. However, these trading regulations are rarely implemented in their full capacities in every country. Indeed, the rate of introduction of alien species is surging globally, and new invasions have been predicted⁴. Domestic trading regulations are usually focused on species having severe negative impacts⁵. This approach often allows some potentially invasive alien plants to remain on the market, and the domestic trading network helps these species spread to new localities⁶.

The role of international trade in the Indian economy has been growing steadily for the last four decades, and according to World Bank estimate⁷, India's trade volume as a share of gross domestic product is becoming closer to the global average over the years. It is expected that the likelihood of alien species introduction will also increase in the coming years. Therefore, it is time for an audit of the trading regulations that India has to manage the introduction and spread of alien species in the country.



An invasive alien plant species (IAPS), *Lantana camara*, grows in a forest edge. Observed in Chikmagalur, Karnataka.

© A. K. Banerjee

Trading regulations for IAS in India

India is not new to the concept and consequences of the invasive alien species (IAS). According to a global estimate⁸, the country currently has 88 alien animals and 2082 alien plants, out of which 16 animals and 266 plants have become invasive. India has also adopted the Aichi Biodiversity Targets that include identifying and prioritizing IAS, controlling, or eradicating the priority species, and implementing measures to prevent their introduction and spread. As mentioned in the report⁹ on the transnational policy network in 2011, the country currently has ten legislations related to IAS. However, the existing regulations barely cover the broad spectrum of IAS present in the country.



For example, the list of quarantine plants (prohibited, restricted, and regulated for trading in India), under The Plant Quarantine Order 2003, includes 57 species¹⁰, many of which are hosts of important pests or diseases of arable crops and forestry. Surprisingly, the quarantine list does not include any invasive alien plant species (IAPS), including those that are recognized by other government and research agencies in the country. The list of 571 plants and plant materials¹¹ mentioned in Schedule VI which are permitted to be imported into India with additional declaration and special conditions has only six recognized IAPS. This situation contrasts with existing mechanisms for regulating the import of germplasms, GMOs, transgenics, and biocontrol agents. A large number of IAPS, like *Parthenium hysterophorus*, were accidentally introduced into India. Unfortunately, there are no regulatory mechanisms to check the accidental introduction of IAPS at the sea-, land- or airports of the country.

On the domestic front too, risk assessment of agricultural pests is the primary focus of the biosecurity policies. For example, The Destructive Insects and Pests Act, of 1914, has focused on preventing the transport of fungal or other plant pests destructive to arable crops and forestry within the country. India has nine additional policies, which

are focused primarily on agricultural pests and insects for different states and regions (e.g., The Assam Agricultural Pests and Diseases Act, 1950). Consequently, a national policy or legislation to regulate movements of IAPS within the country and their management is lacking.

Online trading of IAS in India

In recent years, online trading, also known as e-trading, has provided an emerging global distribution channel for alien species. Compared to in-person trading, e-trading has many advantages for sellers and customers, but it can be challenging to monitor and control due to its heterogeneity, dynamic nature, and involvement of many small and informal sellers. Ease of trading through online marketplaces, especially due to technological advancements in recent years, can escalate the invasion probability of alien species.

The global e-commerce market continues to grow over the years, and with US\$ 118.9 billion worth of e-commerce sales¹² in 2023, India is in 6th position globally. With the predicted increase of global e-trade volumes¹³ in the coming decades, it is expected that e-trading will facilitate new alien plant species' introductions into the country. However, India has currently no surveillance system for monitoring the online trade of IAS in India.

Indeed, a recent study¹⁴ on the online trading of IAPS revealed that nearly one-third of the recognized IAPS are actively sold by online nurseries. The list of the traded species includes some of the World's 100 worst invasive species (like *Acacia mearnsii* or black wattle) and some of the IAPS recognized in India's 5th National Report submitted to the Convention on Biological Diversity [e.g., *Lantana camara* (Lantana), *Mimosa pudica* (Touch-me-not)]. Alarming, among the 54 terrestrial plant species¹⁵ identified as IAPS in India by the National Biodiversity Authority, Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India, 17 species [e.g., *Ageratina adenophora* (Crofton weed), *Parthenium hysterophorus* (Carrot grass), *Prosopis juliflora* (Mesquite)] were found to be actively traded in India.



An invasive alien plant species (IAPS), *Mikania micrantha*, grows along the road to Thalassery, Kerala. Roads often function as corridors of long-distance spread and establishment of IAPS. © A. K. Banerjee

Roads ahead

The evidence presented here, although focused on plants, clearly shows that the current biosecurity infrastructure is not enough to regulate the trading of IAS in India, both from outside and within the country. One likely reason for this oversight could be the general perceptions of the IAS in the country. When the question comes to impact, the IAS often takes backstage compared to crops' pathogens. Acknowledging by public and government sectors that the IAS are of grave concern to livelihood, more so in the long-term, should be the first step to combat this problem.



An invasive alien plant species (IAPS), *Mimosa pudica*, observed in a fallow land. Observed in Kerala. © A. K. Banerjee

Following global examples, India can think about forming a National Invasive Species Strategy and Action Plan (NISSAP). A standardized risk assessment framework is necessary, based on which the quarantine list will be updated regularly

and trade regulation of the selected IAS within the country will be implemented. A continuous and dynamic surveillance system of online trade is necessary. Modern technologies, such as artificial intelligence (AI) and machine learning, can also be used to strengthen the surveillance system by obtaining real-time information, species identification, and recording public feedback.

For effective implementation of the IAS-specific policies, India needs a transparent and decentralized system with different stakeholders onboard. The system can also work toward developing an effective communication strategy to increase public awareness. A dedicated and trained task force is required for legal enforcement, improving border security, dissemination of government and public activities, and creating public awareness.

Concluding note

Economic development and environmental welfare need not be contradictory but can be achieved harmoniously. India has several examples of it. Now is the time to acknowledge the IAS threat and deal with this problem with utmost sincerity. Developing an IAS-specific action plan and a dedicated biosecurity infrastructure for its effective and timely implementation are required to safeguard the country from ongoing and upcoming biological invasion events.

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Dietary preferences of White Cheeked Barbets (*Psilopogon viridis*) observed from various habitats in Kerala, India

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The White Cheeked Barbet *Psilopogon viridis* (Boddaert, 1783) is a common endemic bird of the Western Ghats, its distribution ranges from Surat Dangs in Gujarat along the western ghats range to the eastern ghats in Tamil Nadu (Ali & Ripley, 1987). It comes under the order Piciformes in the family Megalaimidae. Earlier it was placed under the genus *Megalaima* but was transferred to *Psilopogon* by various authors (Dickinson & Remsen, 2013; Trounov & Vasilieva, 2014). These birds are primarily frugivorous and are important pollinators and seed dispersal agents in their ecosystems. Sometimes they are considered minor pests in fruit orchards (Basheer & Aarif 2012; Ranjith et al. 2023). Dietary studies on this species have been conducted by earlier workers (Hafiz & Yahya 2000; Basheer & Aarif 2012) and our study aims to add more species of plants that were not observed by earlier workers.

Our study was purely observational and not at all invasive to the natural state of the birds. In contrast with traditional dietary studies which employed techniques like capturing birds and conducting gut analysis, food retrieval

from chicks or dropping analysis, this study entirely used observations in which the bird was clearly seen consuming particular foods. The observations were made from many regions within Kerala including Adoor, U.C. College Campus Aluva, Periyar Tiger Reserve, *Karingali Puncha* etc. The observations were made opportunistically over a span of two years from January 2022 to March 2024. The observations were made using a Nikon Aculon 16x50 Binoculars and photographs were captured using a DSLR camera (Nikon D5300 and 70-300mm lens).



Sl.No.	Plant	Family	Part consumed	Nativity
1.	<i>Annona muricata</i>	Annonaceae	Fruit	Central America and West Indies
2.	<i>Annona squamosa</i>	Annonaceae	Fruit	Central America and West Indies
3.	<i>Artocarpus heterophyllus</i>	Moraceae	Fruit & Flower	South India
4.	<i>Artocarpus hirsutus</i>	Moraceae	Fruit	Southern Western Ghats and Sri Lanka
5.	<i>Bombax ceiba</i>	Malvaceae	Flower	Tropical Asia and New Guinea
6.	<i>Carallia brachiata</i>	Rhizophoraceae	Fruit	Indo-Malesia to Australia and China
7.	<i>Carica papaya</i>	Caricaceae	Fruit	Tropical America
8.	<i>Caryota urens</i>	Arecaceae	Fruit	Southern India, Sri Lanka and Bangladesh
9.	<i>Centrosema pubescens</i>	Fabaceae	Flower	Americas
10.	<i>Cissus latifolia</i>	Vitaceae	Fruit	Peninsular India and Sri Lanka
11.	<i>Coffea arabica</i>	Rubiaceae	Fruit	Africa
12.	<i>Elaeis guineensis</i>	Arecaceae	Fruit	West and Southwest Africa
13.	<i>Lantana camara</i>	Verbenaceae	Fruit	Native to the American tropics
14.	<i>Licuala grandis</i>	Arecaceae	Fruit	Native of Pacific Islands

15.	<i>Mangifera indica</i>	Anacardiaceae	Fruit & Flower	Indo-Malaysia
16.	<i>Manilkara zapota</i>	Sapotaceae	Fruit	Native of South and Central America
17.	<i>Muntingia calabura</i>	Muntingiaceae	Fruit	Native of Tropical America and West Indies
18.	<i>Musa</i> sp.	Musaceae	Fruit	Tropical & Subtropical Asia
19.	<i>Piper nigrum</i>	Piperaceae	Fruit	Peninsular India
20.	<i>Psidium guajava</i>	Myrtaceae	Fruit	Tropical America
21.	<i>Ziziphus oenoplia</i>	Rhamnaceae	Fruit	China, Tropical Asia and Australia



A | White Cheeked Barbet feeding on *Centrosema pubescens* | © Alen A P

B | White Cheeked Barbet feeding on *Carica papaya* | © Alen A

C | White Cheeked Barbet feeding on *Bombax ceiba* | © Alen A P

D | White Cheeked Barbet feeding on *Piper nigrum*
© Bindu Krishnan

E | White Cheeked Barbet feeding on *Psidium guajava* | © Aseem Kothiala

F | White Cheeked Barbet feeding on *Carallia brachiata* | © Alen A P



G | White Cheeked Barbet feeding on *Atrocarpus heterophyllus* | © Alen A P

H | White Cheeked Barbet feeding on *Carica papaya* | © Alen A P

I | White Cheeked Barbet feeding on *Cissus latifolia* | © Alen A

J | White Cheeked Barbet feeding on *Ziziphus oenopolia* | © Arun Varghese

White cheeked barbets are noisy and hungry birds, usually seen as a couple or a group of 3-4 birds, who start foraging at first light and almost always prefer to stay in the canopy, rarely coming to the ground. These predominantly frugivorous occasionally feed on flowers. The fruits are consumed by pecking and swallowing small chunks. Small flowers were seen being swallowed as a whole. During the study it was observed that out of the 21 plants from which the birds were seen feeding on, 47.62% (10) were native to the Indian Subcontinent but the remaining 52.38% (11) were either Invasive plants like *Lantana camara*, Exotic ornamental plants like *Licuala grandis*, foreign but naturalized crop plants like *Coffea arabica*, *Elaeis guineensis* etc. and domesticated plants like *Musa sp.* as well.

The ability of this species to include invasive and exotic plants as a major part of its diet is noteworthy. In conclusion we can consider this as a huge advantage for the species in adapting to habitats undergoing vegetation change due to anthropogenic impacts. From our observations it is evident that its diet also includes flowers and not only fruits. Its ability to shift its diet to the most abundant food source during each season ensures food availability throughout the year.

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Achievement

EIACP Co-Ordinator, Dr Maya Mahajan spotlighted in Fox Story India Magazine's *Women-Faces of the Year 2024 Awardee*



The February 2024 edition of Fox Story India Magazine is packed with power, showcasing the achievements of 100 exceptional women who are redefining growth and making significant contributions. These women are involved in a wide range of fields, from the thrilling world of Formula 'One race' to addressing critical concerns such as education,

mental health, and sustainable practices. This edition highlights their remarkable journeys and the impact they have made in their respective domains.

Dr. Maya Mahajan, an Environmental and Sustainability Professional, stands out among these exceptional women with her three decades of expertise. She has made notable accomplishments, including the

establishment of the Siruvani Lantana Furniture and Craft Center and the Dahanu Taluka Bachao Samiti, both of which involve indigenous people. Her dedication and selflessness have been recognized through prestigious awards such as the Kovai Wonder Woman Award 2019 from Indian Express and the Viva International Women Achiever Award in 2018. Additionally, Future Generali

acknowledged her as a social change maker and featured her on their calendar. Currently, she holds the position of Co-Ordinator-EIACP RP on Biological Invasions at AVV, Ettimadai, where she actively engages in research, management, and raising awareness about Invasive Alien Species among various stakeholders.



International Day of Forests 2024

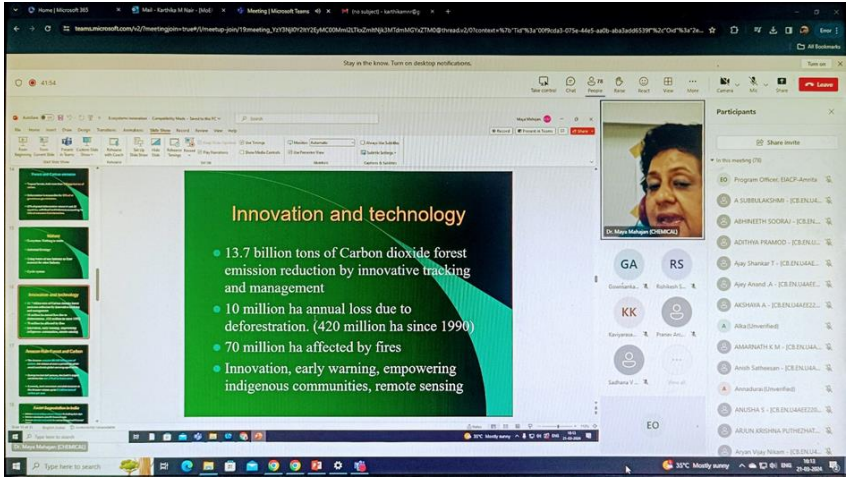
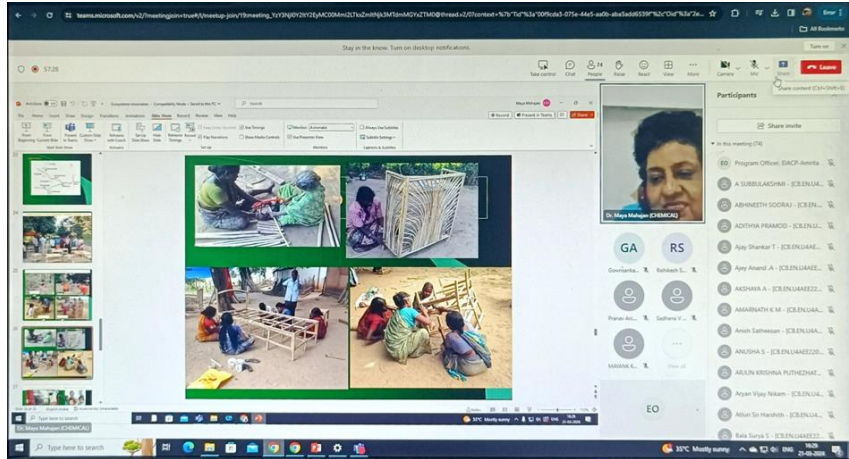
1. Webinar on Forests and Innovation: New Solutions for a Better World

The webinar on the occasion of the International Day of Forests was held on March 21st, 2024, organized by EIACP-Amrita University. Dr. Maya Mahajan, the EIACP Coordinator and Associate Professor at Amrita University who has more than 30 years of experience in research and training in forest conservation, was the distinguished speaker for the event. During the webinar, Dr. Maya delved into various topics related to forests, including the different types of forests, ecosystem services they provide such as water management, carbon sequestration, preventing soil erosion and the current challenges faced

by forests, such as urbanization, industrialization and biological invasions.

Furthermore, Dr. Maya highlighted examples of effective and innovative forest management practices, such as utilizing invasive weeds like Lantana for craft and furniture making through community involvement in various states in India. The webinar attracted a total of 79 participants who found the session to be valuable, engaging, and enlightening. It was an insightful opportunity for attendees to gain knowledge about the importance of forests and the significance and of sustainable forest management practices in today's world.





2. Lecture on Biodiversity & Conservation and screening of documentary

In commemoration of the International Day of Forests, Karthika Nair, Program Officer at Amrita Vishwa Vidyapeetham EIACP Center, delivered a presentation on biodiversity on March 7, 2024. The discussion covered various aspects such as the fundamentals of biodiversity, estimation techniques, notable scientists in the field, and their contributions. Additionally, the global biodiversity scenario was explored with a specific focus on the Indian terrain and its biogeographical zones, including hotspots and endemism. Furthermore, Karthika provided insights into different government strategies aimed at conserving the Western Ghats, with particular attention given to the Gadgil, Kasturirangan, and Oomen V Oomen commission reports.

Following the informative session, an interactive discussion took place, allowing participants to engage in a question and answer session, fostering a deeper understanding of the topic.

On March 14, 2024, a documentary titled "Save our Sholas" was screened for a group of sixty-seven students from Amrita University. This documentary was

released in conjunction with the celebration of the 25th anniversary of Kerala's Silent Valley rainforest being declared a National Park. Created by Shekar Dattatri and his team, the film sheds light on the critical significance of preserving such ecosystems. Narrated by renowned conservationist Valmik Thapar, the 24-minute documentary, titled 'SOS - Save Our Sholas', showcases the rich biodiversity found in the forests of the southern Western Ghats and the challenges faced by this delicate environment.

The film particularly emphasizes the vital role these forests play in water conservation, highlighting that major rivers in peninsular India originate from the Western Ghats. The establishment of Silent Valley as a National Park marked a significant milestone in India's conservation efforts, following a spirited campaign led by individuals from diverse backgrounds to oppose a dam project by the Kerala State Electricity Board that posed a threat to submerge a large portion of the pristine forest.



3. MCQ on Biodiversity and Forests

Amrita University students engaged in a multiple-choice quiz to commemorate the International Day of Forests in 2024. From the sixty-eight participants, three winners emerged based on their exceptional scores. Harsh Panjrath, A Subbulakshmi, and M Nandhini clinched the first, second, and third positions, respectively.

The result of the quiz was revealed during a webinar held on the forest day, where Dr. Maya Mahajan, the EIACP Coordinator, extended her formal congratulations to all the participants and specifically acknowledged the achievements of the winners.





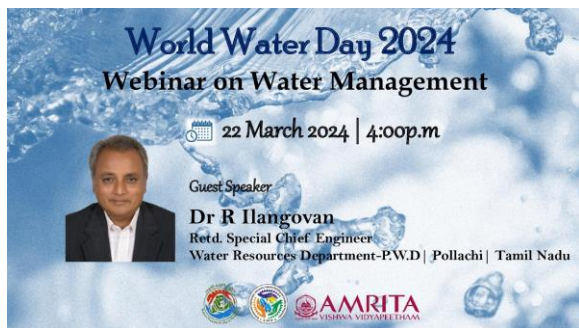
Interaction by Dr Maya Mahajan with Winners of Quiz Competition

Winners of MCQ Quiz conducted for Amrita Students by EIACP and Nature club

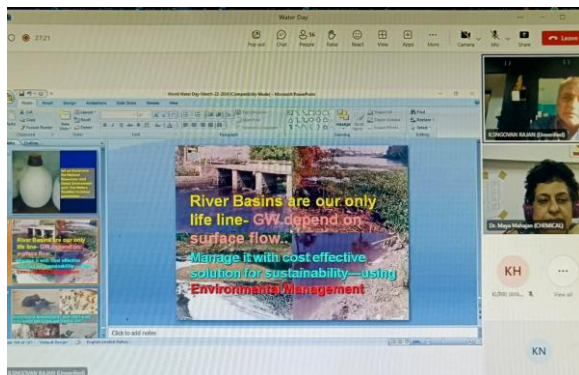


World Water Day 2024

Dr. R. Ilangovan, a retired Special Chief Engineer from the Water Resources Department of PWD in Pollachi, Tamil Nadu, was the distinguished speaker of the webinar on Water Management organized by EIACP-RP at Amrita Vishwa Vidyapeetham to commemorate World Water Day 2024. Despite his retirement, Dr. Ilangovan continues to show unwavering dedication to environmental conservation, with a particular focus on safeguarding water resources.

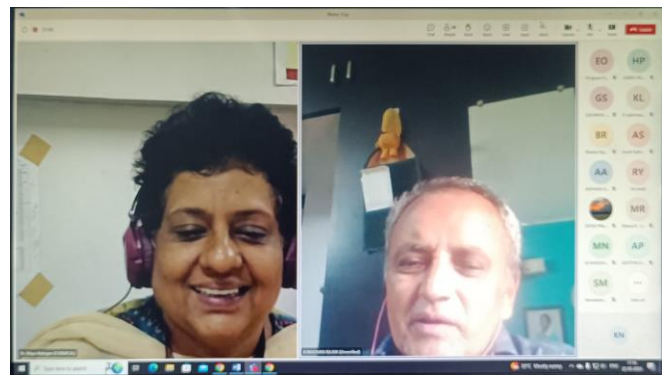


The webinar took place on March 22nd, 2024, and commenced with an introduction by Karthika M Nair, the program officer of the EIACP center at Amrita University. Dr. R. Ilangovan drew



from his extensive career experiences to shed light on the pressing water-related issues faced by the Tamil Nadu region, such as water scarcity and challenges arising from climate change. His insights provided valuable perspectives on the current state of water resources in the area.

Moreover, the event featured an engaging interactive session led by Dr. Maya Mahajan, the EIACP Coordinator, where Dr. Ilangovan and participants delved into the specific water scarcity concerns in Coimbatore, Tamil Nadu. The exchange of ideas and expertise during this session underscored the importance of collaborative efforts in addressing local water challenges. Dr. Ilangovan's participation in the webinar served as a testament to his ongoing commitment to promoting sustainable water management practices for the benefit of communities in Tamil Nadu and beyond.



Earth Hour 2024

Earth Hour, an initiative spearheaded by WWF, serves as a global grassroots campaign that aims to mobilize individuals and organizations to take action on environmental issues and safeguard the planet. Initially established as a simple "lights out" event in Sydney, Australia back in 2007, Earth Hour has now evolved into a massive movement with millions of supporters across more than 185 countries and territories. Through its efforts to inspire people worldwide to make a difference for the environment and push for policy changes, Earth Hour has emerged as a powerful symbol of the collective dedication to preserving nature and the Earth.

The impact of Earth Hour extends beyond just raising awareness, as it has played a pivotal role in driving substantial legislative transformations by leveraging the strength of the masses. In alignment with this noble cause, EIACP-Amrita Vishwa Vidyapeetham has taken proactive steps by designing a flyer and encouraging students, faculty members at Amrita, and also total of 615 external participants to join in the initiative. The

call to action is simple yet significant - to switch off all non-essential lights for an hour on March 23, 2024, from 8:30 p.m. to 9:30 p.m., thereby contributing to the global movement towards environmental conservation.



By actively participating in Earth Hour, individuals and organizations demonstrate their commitment to sustainability and environmental stewardship. This collective effort not only symbolizes a shared responsibility towards protecting the planet but also underscores the importance of taking concrete actions to address pressing environmental challenges. Through initiatives like Earth Hour, the global community can unite in a common goal of promoting environmental consciousness and fostering a sustainable future for generations to come.

'Green wheels' | Interview with Dr Maya Mahajan

Associate Professor and EIACP Coordinator

Amrita Vishwa Vidyapeetham, Coimbatore, Tamil Nadu



Dr Maya Mahajan, Coordinator at EIACP RP (MoEFCC) and the Associate Professor at Amrita Vishwa Vidyapeetham Coimbatore is a profound environmental enthusiast with 30 years of experience in Environment and Sustainable development. She has been inspiring people with her lifestyle by adopting different themes of mission life, one among them is her vision of switching to sustainable mode of transportation. This interview article is based on her thoughts and journey of Electric car purchase.

These days' transportation has been made much easier and environmentally friendly by Electric Car or Electronic Vehicle (EV). Dr Maya Mahajan revealed that being a pet parent she has faced restrictions & difficulties travelling with her pets, as well as the poor connecting bus service to Ettimadai make the travelling much more difficult, which lead her to decide finally on buying herself a car, which she had avoided for last 30 years.

? Why Electric cars over Traditional Petrol Cars.

There was a public misconception on electric car's limited mileage and charging time of the battery, which was later improvised with much better technology. The lack of electric vehicle supplies equipment and charging hubs were another concern in the beginning. But now a day, there has been a fair rise in the availability of potent charging facilities. However, environmental impact assessment of EV-Batteries indicated comparatively less lifetime emissions than fuel cars.

After doing some in-depth research and brain storming sessions with my students including Mr Kamalesh, Alumnus from Mechanical Engineering Department of Amrita Vishwa Vidyapeetham inspired me to hang on it.

Even though it was beyond my budget, I believe I could save fuel costs and follow sustainable practices in my daily life. Being an Environmental educator, I am pleased to be one of the very first EV car owners of Amrita campus.

? How long have you been using the Electric car? What are the advantages and disadvantages noticed while using?

I have been using this TATA Tiago Electric car for 9 months from 31th July 2023 (Green gift to myself on my birthday). So far, I have not found much downside except for nonstop long distance travel. I love its smooth performance on the road especially with zero noise, zero pollution! It takes around one hour to charge at hubs than at home which may takes about 7-8 hours. On a fully charged mode, the car can cover up to 200 km, saves waiting time at fuel stations.

better options involving solar power assisted vehicles, which surely can make a change in the livelihood of people and the overall harmony of our nature.

? How do you think electric cars fit into our environmental goals such as reducing pollution and combating climate change?

The main distinguishable features of EV benefiting the environment is the reduction of greenhouse gas emission



Furthermore, lower operating cost, Technical innovative infrastructure and designs, less air pollution and noise pollution, Sustainable and environmentally friendly option with very low cost are some other notable advantages.

For long drives only, we must locate the charging stations in prior and assure the battery percentage. Our future holds

contributing to global warming. It improves the air quality especially in Urban areas leading to the elimination of pollutants such as nitrogen oxides (NOx), particulate matter (PM), and volatile organic compounds (VOCs).

Countering their eco-friendly part, the battery issues of EVs (electric vehicles) form the harmful side. Manufacturing of batteries compel frequent extraction of

metals like lithium, cobalt, nickel and other minerals resulting in habitat destruction and energy depletion. However, we way the balance between electric and petrol based vehicles, definitely EV is having much lesser impact on environment. If charging stations for EV are operated on Solar power, that would be the most sustainable and eco-friendly approach.

Sometimes the improper disposal of battery can lead to leaching of hazardous materials. However, there are several preventive measures like recycling the battery to reduce the extraction of new resources. Above all, proper scientific disposal finds as the easiest and efficient practice!

? Will EV Cars replace the Petrol/Diesel car in the coming years

Even though it depends on the customer preference, there might be high chances of people choosing eco-friendly EV, because of the Cost consideration and the expanded charging points. Considering the novel technology and green innovations, I believe it is the future.

Recently, a project in Pune, Maharashtra has initiated the installation of solar-powered electric vehicle charging stations in order to decrease reliance on conventional grid electricity. This shift towards renewable energy sources for powering EV charging stations will have

great significance. As authorities aim to increase electric vehicle usage by 25% by 2025, they are concentrating on enhancing the charging infrastructure by integrating solar energy to promote sustainable mobility. (Read more at https://pune.news/city/pune/pune-leads-maharashtra-with-solar-powered-ev-charging-stations-initiative-165622/#google_vignette)

? Are there any specific government policies or incentives that are encouraging the transition to EV.

EVs are more expensive than traditional cars due to their manufacturing cost, yet government offers various financial incentive including tax credits, rebates, and grants which reduces the initial cost of buying an EV. To promote EV cars, recently Government has invested in establishing more charging stations along the highways, even in private sectors and shopping malls etc. In addition, Government have imposed vehicle emission standard that favours EV. There is government funded research being going on, in alliance with several industries that helps in producing more convenient EV cars.

I think people will choose EVs if there are much subsidies from the government.

In my opinion, actions speak louder than words. Our small approach towards saving energy can contribute to the protection of our ecosystem. As an

individual, it is our responsibility to make sustainable lifestyle by switching from fuel cars to Electric cars.

Hope my version of EV story will be an inspiration for others to choose on sustainable lifestyle and make mindful choices in the betterment of our Environment; sticking on to the 'Save Energy'- a major theme of 'Mission Life'

making the general public as responsible citizens.

*The interview was taken by
Ms. Greeshma Thankachan, Staff at
EIACP-Amrita Vishwa Vidyapeetham,
Coimbatore.*

Extra Shots

https://pune.news/city/pune/pune-leads-maharashtra-with-solar-powered-ev-charging-stations-initiative-165622/#google_vignette



Tech DAD

World's First Permanent Electrified Road to Charge Electric Vehicles While Driving Opens in Sweden

techdadpk The world's first of its kind, Sweden's e-motorway could pave the way for an additional 3,000 kilometers of electric roads by 2035.

Following the EU's recent groundbreaking legislation mandating zero CO2 emissions for all new car sales by 2035, European nations are swiftly gearing up to establish the infrastructure necessary for carbon-neutral transportation.

Sweden is taking a pioneering step by transforming a highway into a permanent electrified road, marking a global first.

Electric roads enable vehicles, including cars and trucks, to recharge their batteries while in motion.

#Driving #Electric #/charge #vehicles

Amrita Innovation & Research Awardee (AIRA 2024): Dr Maya Mahajan

The Amrita Innovation and Research Awards (AIRA) ceremony took place on January 9, 2024, during the Amrita Research and Innovation Symposium for Excellence (ARISE) 2024. More than 500 faculty members from eight Amrita campuses came together to recognize exceptional accomplishments in research and innovation.

The purpose of the award is to encourage collaboration among Amrita faculty members, fostering research that goes beyond traditional academic boundaries to tackle important societal challenges.

Dr. Maya Mahajan was one of the recipients of the AIRA for her remarkable

work in securing funding from the Department of Science and Technology (DST) and the Ministry of Environment, Forest and Climate Change (MoEFCC) for projects related to forest conservation and capacity building for tribal communities over the past ten years.

Dr. Maya's efforts have led to the creation of sustainable livelihoods for communities in various parts of the country, particularly in tribal villages located in Tamil Nadu, Kerala, and Maharashtra.



Webinar on Welfare of street animals, first aid and precautions

The EIACP RP at Amrita Vishwa Vidyapeetham, Coimbatore, in collaboration with the Nature Club of Amrita University, recently hosted a webinar focused on the well-being of street animals, first aid, and precautions. The event took place on October 18, 2023, at 04:30 p.m. The session was led by Dr. Suranjana Ganguly, a Veterinary Surgeon from Sweden and the founder of Woof Wagon Clinic in Mysore, India. Dr. Maya Mahajan, the EIACP Coordinator, an animal lover, and activist, served as the moderator for the event. The webinar attracted a diverse audience, including over 50 students, campus members, and individuals from the animal welfare community. During the webinar, Dr. Ganguly initiated an enlightening discussion on the welfare of street animals, highlighting the various challenges they face in terms of nutrition, shelter, and health. She emphasized the importance of community-driven activities and fostering empathy towards these animals to improve their lives. Dr. Ganguly provided comprehensive

guidance on administering first aid for common health issues such as injuries, infections, and parasitic attacks. She also outlined the necessary steps to provide immediate assistance to street animals and discussed the significance of vaccinations, spaying/neutering, and regular check-ups.

Dr. Ganguly further emphasized that individuals passionate about animal welfare can establish partnerships with local veterinary clinics and non-governmental organizations to facilitate essential preventive care for street animals. The discussion also touched upon the critical role of sterilization programs in addressing the overpopulation of stray animals. Dr. Ganguly shared her personal experiences leading the Whoof Wagon Pet Hospital, an NGO dedicated to advancing the welfare of street animals. Dr. Maya Mahajan echoed Dr. Ganguly's perspectives, underscoring the need for awareness campaigns, adoption drives, and other initiatives to support animal welfare.

EIACP RP (MoEFCC) at Amrita Vishwa Vidyapeetham and Amrita Nature Club invites you to a

Webinar

Welfare of street animals, first aid and precautions

DATE
18 Oct 2023

TIME
04.30 PM IST

SPEAKER
Dr. Suranjana Ganguly
Veterinary Surgeon
Founder
Woof Wagon Clinic



MODERATOR
Dr. Maya Mahajan
Coordinator
EIACP RP
Amrita Vishwa Vidyapeetham
Coimbatore



SCAN to register



Animal Welfare Talk

09:23:55

What is animal welfare?

These are known popularly as the 5 freedoms and forms a baseline for welfare of animals.

The 5 Freedoms of Animal Welfare

1. Freedom from Hunger and Thirst - provide access to fresh water and a healthy diet.
2. Freedom from Discomfort - provide appropriate shelter and resting area.
3. Freedom from Pain, Injury or Disease - prevent or treat illness and injury.
4. Freedom to Express Normal Behaviour - provide enough space, proper facilities, and social interaction.
5. Freedom from Fear and Distress - ensure conditions and treatment that avoid mental suffering.

These 5 freedoms are a basic standard for animal welfare and should be provided to non-human animals in our care.

Dr. Maya Mahajan

DM DB

KK BC

MG

Meeting p... View all

Animal Welfare Talk

09:22:45

Basics of Stray Animal Welfare and First Aid

By:
Dr. Suranjana Ganguly
BSc. (Hons) BVMS MRCVS (Glasgow)

Dr. Suranjana Ganguly

DM

DB

KK

BC

1/4 >

Webinar on Nilgiri Tahr – Wildlife Week 2023

The World Wildlife Week 2023 witnessed a collaborative effort between the Nature Club of Amrita University and the EIACP RP-Amrita University, as they organized a talk that aimed to raise awareness about the endangered Nilgiri Tahr. The event, which took place on October 5, 2023, featured Mr. Predit Paul, the Coordinator for the Worldwide Fund (WWF) in India. With over 70 attendees, including students, researchers, and members of the scientific community, the talk highlighted the urgent need for conservation efforts to protect this highly endangered species.

Dr. Maya Mahajan, the Coordinator of EIACP RP at Amrita Vishwa Vidyapeetham and the Professor in charge of the Nature Club, skillfully moderated the session. Mr. Predit Paul commenced the talk by providing a comprehensive overview of the Nilgiri Tahr, an ungulate species native to the Western Ghats of India. He emphasized the ecological significance of these animals, as they play a vital role in maintaining the delicate ecosystem of the Nilgiri Hills. Their ability to thrive in steep and rugged terrains, coupled with their browsing and grazing habits, contributes significantly to the balance of the local flora.



Image courtesy - Tevin Vincent

SPEAKER
M.A. PREDIT
WWF India

EIACP at Amrita University is organising a Wildlife Week
2023 webinar on
Nilgiri Tahr - A conservation overview
State animal of Tamil Nadu

5 OCT
2023

starting from
5 pm

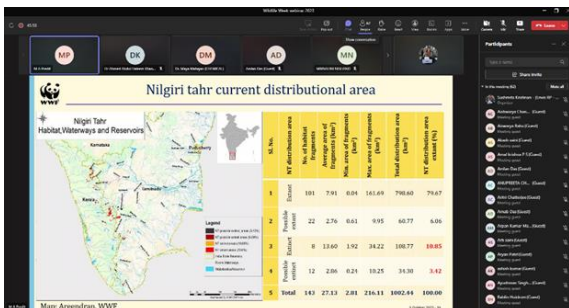
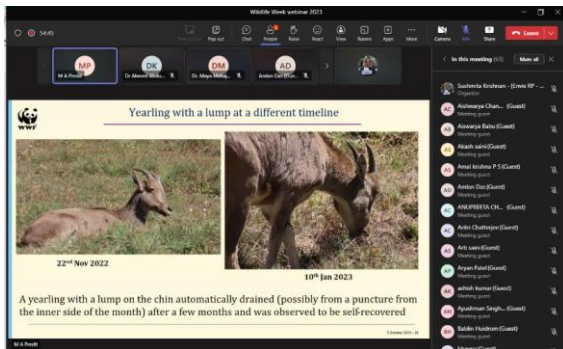
SCAN to register

LIFE
AMRITA
Tamil Nadu

During the talk, Mr. Paul highlighted the crucial role of the Nilgiri Tahr in regulating the growth of grasses and shrubs in the region. This, in turn, has a profound impact on the vegetation structure, composition, and the overall well-being of other herbivores, predators, and even the soil quality. It became evident that the conservation of the Nilgiri Tahr is not merely about protecting a single species but about safeguarding an entire ecosystem. The talk also shed light on the various challenges faced by these animals, including habitat loss, poaching, and disease. With their population declining and now classified as "Endangered" by the

International Union for Conservation of Nature (IUCN), urgent measures are required to address the threats posed by deforestation and encroachment on their natural habitat.

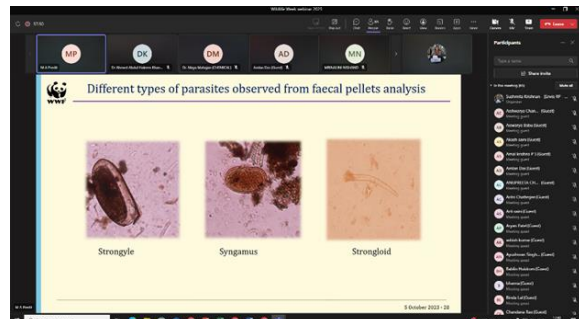
During his presentation at World Wildlife Week 2023, Mr. Predit Paul delved into the ongoing conservation endeavors aimed at protecting the Nilgiri Tahr. These initiatives, spearheaded by government agencies and NGOs such as WWF, encompass a range of activities including habitat restoration, anti-poaching measures, and community engagement in conservation programs. Mr. Paul emphasized the crucial role of local communities in ensuring the success of these efforts, stressing the importance of their active participation.



One of the key highlights of Mr. Paul's talk was the introduction of "Nilgiri Tahr Day 2023." This annual event, which he elaborated on, is dedicated to raising awareness about the Nilgiri Tahr and its conservation. The day will be marked by a variety of engaging activities, including educational workshops, nature walks, and interactive sessions with wildlife experts.

The primary objective of these activities is to foster public engagement and encourage individuals to actively contribute to the protection of this invaluable species.

Mr. Predit Paul's presentation on the Nilgiri Tahr at World Wildlife Week 2023 left a lasting impact, providing both valuable information and inspiration. It underscored the urgent need to safeguard this unique and endangered species, while also shedding light on the ecological significance of the Nilgiri Tahr within the Western Ghats ecosystem. The announcement of Nilgiri Tahr Day 2023 further exemplifies the commitment to raising awareness and promoting conservation efforts, ensuring a brighter future for this iconic species.



Eco – Ganesh Chaturthi Celebrations 2023

The "Eco-Ganesh Chaturthi Contest 2023" organized by Amrita Vishwa Vidyapeetham aimed to promote sustainability and eco-friendliness during the festival. Dr. Maya Mahajan, the Co-Ordinator of EIACP RP and the Nature Club Coordinator, led this innovative initiative. The event emphasized the use of eco-friendly materials for crafting Lord Ganesha idols, aligning the celebration with environmental consciousness.

A key highlight of this year's celebration was the emphasis on using waste potato powder and waste paper to create the Ganesha idols. Participants were encouraged to adopt this unique approach to reduce the environmental impact of the festival. Dr. Maya Mahajan underscored the significance of eco-friendly practices in cultural celebrations, advocating for a future where festivities are conducted in harmony with nature.

In addition to promoting eco-friendliness, the event also featured two exciting contests as part of the Ganesh Chaturthi celebrations. These contests aimed to engage participants in creative and sustainable practices, further reinforcing the message of environmental responsibility. Through initiatives like the "Eco-Ganesh Chaturthi Contest 2023," Amrita Vishwa Vidyapeetham

continues to lead by example in promoting sustainable living and eco-consciousness.

- 1. Eco-Ganesha Making Contest:** The Ganesha idol-making competition saw active involvement from both students and staff, who displayed great enthusiasm throughout the event. Participants showcased their commitment to sustainable practices by creatively using waste potato powder and paper to craft eco-friendly Ganesha idols, highlighting their dedication to environmentally friendly celebrations.



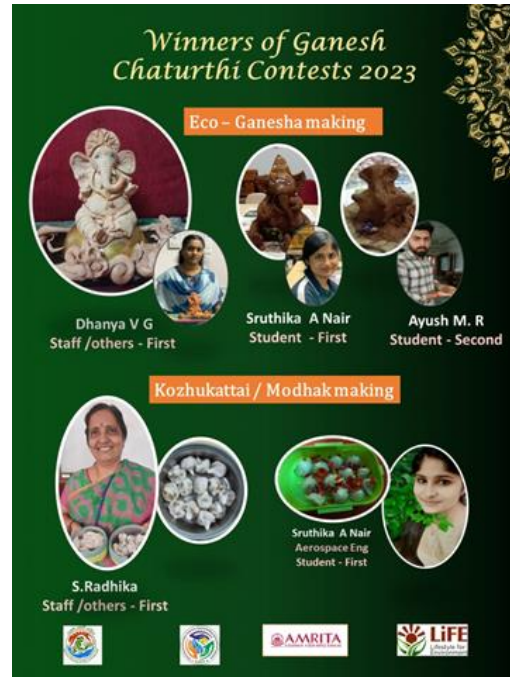
- 2. Modhak Making Contest:** The competition not only featured an idol-making contest but also included a Modhak making competition, showcasing the participants' culinary abilities in preparing Lord Ganesha's favorite treat.

The event garnered a significant turnout from both students and staff, highlighting the enthusiasm and creativity displayed by all involved. It served as a platform for individuals to showcase their artistic and culinary talents, all while promoting eco-consciousness in a fun and engaging way.



At Amrita Vishwa Vidyapeetham, the Eco-Ganesh Chaturthi Contest 2023 was a truly remarkable celebration that showcased the institution's unwavering dedication to sustainability and environmental consciousness. The event highlighted the importance of seeking the blessings of Lord Ganesh during the festivities of Ganesh Chaturthi. The participants wholeheartedly worshipped the beautifully crafted eco-Ganesh idols, fostering a deep connection with the Lord and emphasizing the harmonious blend of tradition and environmental responsibility. This celebration served as

a testament to the institution's commitment to preserving the environment and promoting a sustainable future.



Dr. Maya Mahajan's commitment to advocating for eco-friendly celebrations created a significant opportunity for students and faculty to incorporate eco-consciousness into their festival activities. The competition underscored the idea that cultural events can be enjoyed in a sustainable and environmentally friendly way. Participants were deeply affected by the event, inspiring them to maintain environmentally responsible behaviors in both their festivities and everyday routines. This initiative exemplifies how tradition and environmental awareness can work together harmoniously, paving the way for a brighter future for everyone involved.

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Instructions to the contributors

The articles and other relevant information should be neatly typed in double spaced, not exceeding five pages. The figures, graphs/ drawings should be of good quality and clarity. Photographs should be of minimum 300 dpi resolution. References should be limited and cited in the text by name and year.



Photo Credit | Nikhila K



LIFE
Lifestyle for
Environment



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