

# ANNUAL REPORT

CHATUR ULLU LAB www.chaturullu.in

Year 2025





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# ABOUT CUL

CHATUR ULLU LAB

Chatur Ullu Lab (CUL) is a dynamic research and conservation collective committed to advancing ecological and evolutionary science while promoting a sustainable future.

Inspired by the keen dragonfly (chatur) and the wise owl (ullu), CUL brings together a diverse team of researchers, conservationists, and practitioners united by a shared passion for biodiversity and ecological inquiry.

We work across several thematic areas, including:

- Biogeography & Phylogeny
- Urban Ecology
- Biodiversity Informatics
- Diversity & Distribution
- Outreach & Conservation

Established in 2019, Chatur Ullu Lab continues to grow as a collaborative platform for research, learning, and conservation action.



# PROJECT SNAPSHOTS

In the year 2025, we undertook 08 projects with multiple government, non-governmental, and private organisations, all aligned with five SDGs (06, 11, 13, 14 & 15).







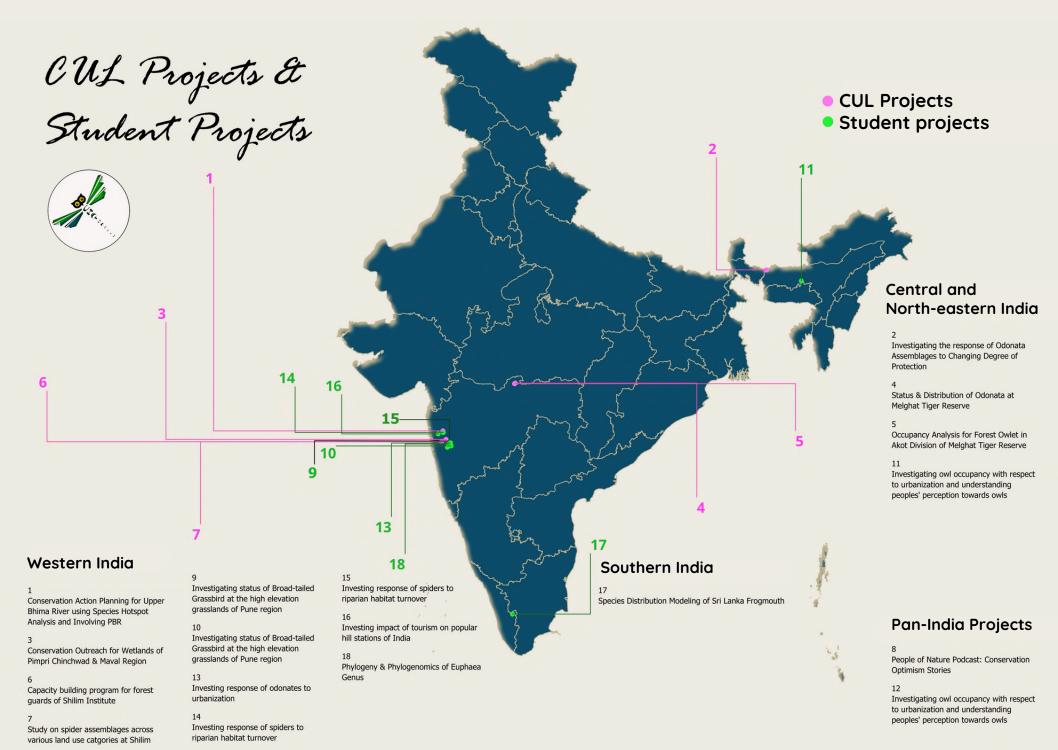












# Conservation Action Planning for Upper Bhima River

#### STUDY AREA

Upper Bhima River Basin, Maharashtra

#### **FUNDED BY**

Maharashtra Gene Bank Project, MSBB, State Government of Maharashtra

- Ameya Deshpande
- Nikhil Kuni
- Shubhankar Khangar
- Joel Philip
- Dhruva Bhatt
- Dr. Vidyadhar Atkore
- Dr. Prasad Kulkarni





# CONSERVATION ACTION PLANNING FOR UPPER BHIMA RIVER

The project aims to create a comprehensive Conservation Action Plan for the Upper Bhima River by integrating species hotspot analysis with community knowledge from People's Biodiversity Registers (PBRs).

The river, crucial for biodiversity and livelihoods in western India, faces pressures from urbanization, pollution, habitat loss, and hydrological changes.

The project will map biodiversity-rich and sensitive zones using spatial datasets, field surveys, e-DNA sampling, and informatics to identify priority areas for protection and restoration.

PBRs and Biodiversity Management Committees will provide local insights and participation, ensuring a practical, community-driven plan that guides policy, strengthens conservation, and enhances landscape resilience.

# Conservation Action Planning for Upper Bhima River



A Giant Squirrel curiously looking at our team at Bhimashankar WLS



Morning waterscape at Bhigwan Reservoir

# Response of Odonates to Varying Degree of Protection

#### STUDY AREA

Raimona National Park, Assam

#### **FUNDED BY**

Wildlife Trust of India (WTI)
IFAW

- Joel Philip
- Arajush Payra
- Dr. Dipti Thakuria





# RESPONSE OF ODONATES TO VARYING DEGREE OF PROTECTION

The project examines how Odonata assemblages respond to different levels of habitat protection, focusing on Raimona National Park, a recently declared protected area in Assam.

Dragonflies and damselflies, key indicators of freshwater health, help reveal how protection influences biodiversity.

The study compares Odonata diversity, community structure, and functional traits between sites inside Raimona and nearby less-protected or modified landscapes.

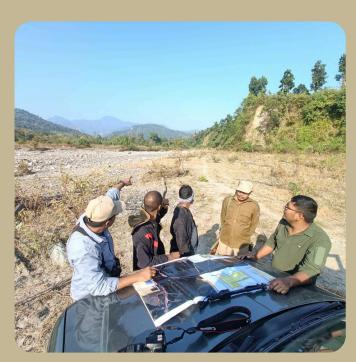
Using field surveys, habitat assessments, and multivariate analyses, the project identifies environmental drivers shaping assemblages and evaluates whether stronger protection supports higher richness or sensitive taxa.

The findings will assess Raimona's ecological effectiveness and guide freshwater biodiversity conservation in Northeast India.

# Response of Odonates to Varying Degree of Protection







Snapshots from field work at Raimona National Park, Assam

# Wetland Conservation through Community Outreach

#### STUDY AREA

Talegaon Dabhade & Maval

#### **FUNDED BY**

Mitsubishi Electric India Pvt Ltd

- Shubhankar Khangar
- Nikhil Kuni
- Saartha Kamble
- Krishnandu Sarkar
- Ameya Deshpande





# WETLAND CONSERVATION THROUGH COMMUNITY OUTREACH

The Conservation Outreach for Wetlands of the Pimpri Chinchwad and Maval Region is an initiative to build public awareness and long-term stewardship of local wetland ecosystems.

These wetlands support biodiversity, groundwater recharge, flood control, and ecological balance but face increasing threats from urbanization and declining environmental awareness.

The project strengthens ecological literacy among students, community groups, and local residents through workshops, field visits, interactive demonstrations, and engagement sessions.

By highlighting the ecological, social, and economic value of wetlands, the initiative encourages informed participation and collective responsibility, promoting community-driven conservation and sustainable practices to protect these vital ecosystems for future generations.

# Wetland Conservation through Community Outreach







Snapshots of various outreach activities conducted across women SHG groups, citizens, community members, and students on biodiversity, water security, wetland conservation, and climate action

# Diversity of Odonata at Melghat

#### STUDY AREA

Melghat Tiger Reserve, Amravati

#### **FUNDED BY**

State Forest Department

- Dhruv Parmar
- Forest Guards





# DIVERSITY OF ODONATA AT MELGHAT

The Status and Distribution of Odonata at Melghat Tiger Reserve project systematically assesses dragonfly and damselfly diversity across the reserve's freshwater habitats.

As key bioindicators, Odonata offer insights into aquatic ecosystem health, aiding effective conservation planning. Melghat's rivers, streams, wetlands, and forested landscapes provide diverse microhabitats supporting rich assemblages.

Through structured field surveys and habitat assessments, the project documents species presence, abundance, distribution, and seasonal patterns.

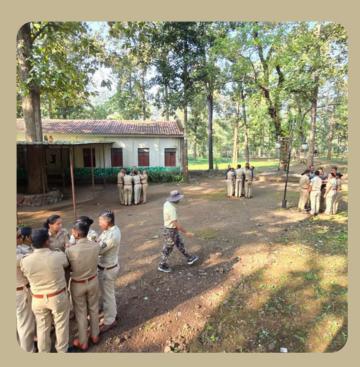
The findings identify species-rich zones, vulnerable habitats, and emerging threats, supporting evidence-based management.

Overall, the project strengthens freshwater biodiversity conservation, enhances long-term ecological monitoring, and contributes to protecting Melghat's sensitive aquatic ecosystems.

# Diversity of Odonata at Melghat







Snapshots of capacity building programs, along with an active research project on odonates of Melghat Tiger Reserve, in association with the Melghat Tiger Reserve team

## Study of Forest Owlet in Akot

#### STUDY AREA

Melghat Tiger Reserve, Amravati

#### **FUNDED BY**

State Forest Department

- Inshiya Vohra
- Forest Staff Akot Division





The Occupancy Analysis for the Forest Owlet in the Akot Division of Melghat Tiger Reserve aims to assess the distribution, habitat use, and detection probability of the threatened and endemic Forest Owlet (Athene blewitti).

Akot's dry deciduous forests, cliffs, and woodland patches provide suitable habitats for this elusive species.

Using systematic surveys, call-response methods, and habitat assessments, the project evaluates site occupancy and identifies ecological factors influencing its presence.

# STUDY OF FOREST OWLET IN AKOT

The study maps key conservation areas, highlights priority habitats and potential threats, and supports adaptive management, contributing to safeguarding Forest Owlet populations and strengthening evidence-based conservation in Melghat.

### Study of Forest Owlet in Akot







Frontline forest staff have come together to safeguard habitats of the Endangered Forest Owlet at Melghat Tiger Reserve

# Capacity Building of Forest Guards

#### STUDY AREA

Shilim Institute, Shilim, Pune

#### **FUNDED BY**

Shilim Institute

- Krishnandu Sarkar
- Shubhankar Khangar





# CAPACITY BUILDING OF FOREST GUARDS

The Capacity Building Program for Forest Guards of Shilim Institute aims to strengthen the skills, knowledge, and effectiveness of frontline forest personnel.

Forest guards play a crucial role in biodiversity protection, habitat monitoring, and enforcement, making regular training essential.

The program enhances practical competencies through structured sessions, field demonstrations, and interactive workshops.

Key areas include wildlife identification, patrolling, data collection, human-wildlife conflict management, and the use of modern monitoring tools.

Soft skills such as communication and community engagement are also emphasized.

By equipping guards with updated knowledge and handson experience, the program improves protection efforts and builds a confident, well-prepared frontline workforce.

## Capacity Building of Forest Guards







Forest guards of Shilim Institute immerse into wildlife research methods to convert the on-going sitespecific conservation into meaningful research-based action

## Spiders across Land Use

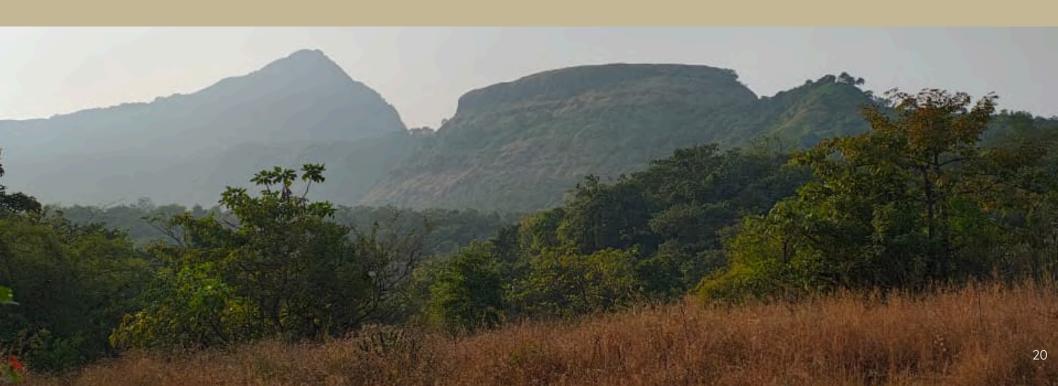
#### STUDY AREA

Shilim Institute, Shilim, Pune

#### **FUNDED BY**

Shilim Institute

- Nikhil Kuni
- Shubhankar Khangar
- Dhruva Bhatt





# SPIDERS ACROSS

LAND USE

The study of spider assemblages across different landuse categories in Shilim assesses how diversity, distribution, and community patterns vary with changing habitats.

As important predators that regulate insect populations, spiders serve as indicators of habitat quality and environmental change.

Shilim's landscape includes forests, plantations, grasslands, agricultural fields, and semi-urban areas. Using systematic sampling, species identification, and habitat characterization, the study analyzes variations in species richness, abundance, and functional diversity.

The findings reveal how land use shapes arthropod communities, identify sensitive habitats and diversity hotspots, and support evidence-based conservation and sustainable land management in the Shilim region.

# Spiders across Land Use



The Shilim landscape offers numerous micro-habitats for studies pertaining to lesser-known species such as spiders. Our team is conducting various field sampling and specimen examinations on-site.

### People of Nature Podcast

#### STUDY AREA

Pan India

#### **FUNDED BY**

IndiaBioscience

- Arjit Jere
- Prosenjit Dawn
- Dr. Smrithy Vijayan
- Dr. Oishimaya Sengupta
- Shubhankar Khangar





The People of Nature Podcast, supported by the 4th and 5th IndiaBioscience Outreach Grants, is a science communication initiative that amplifies voices underrepresented in environmental conversations.

By featuring speakers from minority and economically disadvantaged communities, the podcast provides a platform to share personal stories of conservation optimism and lived experiences.

Guests include scientists, educators, and practitioners from tribal groups, women, transgender biologists, and individuals from weaker economic backgrounds.

Their narratives highlight resilience, traditional knowledge, and impactful contributions.

By showcasing these journeys, the podcast inspires young listeners to engage with environmental issues and recognize the efforts of often-unacknowledged conservation heroes.

# PEOPLE OF NATURE PODCAST

### People of Nature Podcast







People of Nature Podcast now features in multiple languages including English, Marathi, Hindi, Gujarati, Bengali, and Malyalam. Tune in to listen: <a href="https://soundcloud.com/peopleofnaturepodcast">https://soundcloud.com/peopleofnaturepodcast</a>



# RESEARCHER SPOTLIGHT

The year 2025, our team undertook 07 research projects focusing on specific taxa, all aligned with five SDGs (06, 11, 13, 14 & 15).



















# INVESTIGATING STATUS OF BROADTAILED GRASSBIRD AT PUNE

The Broad-tailed Grassbird (Schoenicola platyurus) is an Old World warbler endemic to the Western Ghats of India and is currently classified as Near Threatened by the IUCN Red List.

The Pune region, including areas like Sinhagad Fort, represents one of the isolated pockets in Maharashtra where the species has been recently recorded, with potential evidence of breeding.

This project aims to investigate the current population status, distribution, and habitat use of the Broad-tailed Grassbird within the high-elevation grasslands of the Pune region to inform targeted conservation strategies for this threatened and poorly-understood species.



Krishnandu Sarkar



Ameya Deshpande

## Investigating status of Broadtailed Grassbird at Pune region







Our research team working at high elevation grassland areas in and around Pune, in search of the elusive Broad-tailed Grassbird



# STUDYING URBAN OWLS IN INDIA

Owls are critical, yet often misunderstood, components of urban and peri-urban ecosystems. Their role as apex predators makes them sensitive indicators of environmental health.

This project focuses on investigating the patterns of owl occupancy across a gradient of urbanisation, aiming to understand how increasing human development impacts their distribution and survival.

A second crucial objective is to document cultural narratives around owls, as well as record urban communities' perceptions and attitudes towards them. Negative perceptions, driven by cultural myths or fears, can lead to human-owl conflict and threaten conservation efforts.

The findings will provide essential data for evidence-based conservation planning, promoting coexistence, and ensuring the long-term persistence of owl populations in rapidly changing urban environments.



# Studying urban owls in India







Debangini's PhD research leads her to investigate owl rescues, people's perception towards the nocturnal birds, owl occupancy with respect to urbanisation, and to winning the best poster at the Student Conference on Conservation Science 2025!



# INVESTIGATING THE RESPONSE OF ODONATES TO URBANISATION

Odonates (dragonflies and damselflies) are highly sensitive bio-indicators of aquatic and riparian ecosystem health.

This project, based in Pune, investigates how these insects respond to the increasing pressures of urbanisation, specifically focusing on changes in species diversity, abundance, and community structure across different urban, suburban, and natural habitats.

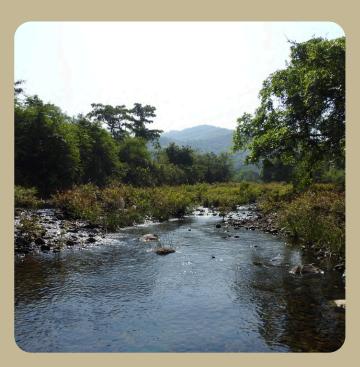
Rapid and unplanned urban growth in Pune has led to habitat fragmentation, pollution of water bodies, and loss of green spaces, all of which critically impact odonate populations.

Understanding their ecological response provides vital insights into the overall biodiversity status of the region's freshwater systems. The findings will be instrumental in developing guidelines for urban planning and water body conservation to sustain odonate diversity within the Pune city limits.



Arajush Payra

# Investigating the Response of Odonates to Urbanisation







Arajush's PhD project takes him to study riverine urban gradient and the response of odonates to it in terms of diversity, abundance, and behavioral adaptations



# INVESTIGATING THE RESPONSE OF SPIDERS TO URBANISATION

Nikhil's PhD project examines how spider communities respond to different land-use categories in the rapidly urbanising Pune District.

As sensitive indicators of ecological change, spiders help assess the impacts of habitat alteration.

The study compares species richness, community composition, and guild structure across urban areas, periurban zones, agricultural fields, grasslands, and seminatural habitats. Using systematic sampling, habitat characterisation, and biodiversity analyses, it identifies environmental factors shaping assemblages and evaluates how urbanisation drives diversity loss, functional shifts, and generalist dominance.

The findings will inform evidence-based urban planning, habitat restoration, and conservation strategies to maintain biodiversity within Pune's expanding urban landscape.



Nikhil Kuni

#### **PROJECTS**

## Investigating the response of spiders to urbanisation







Nikhil's PhD project looks at micro-habitat changes when major land use changes occur as a city grows rapidly. He studies spiders in an urban web.



Pratiksha's project investigates the critical threshold of carrying capacity in India's fragile mountain ecosystems, focusing on Matheran, Mussoorie, Mahabaleshwar, and Wayanad.

While tourism drives local economies, unchecked footfalls have precipitated severe ecological degradation.

Her study analyses distinct anthropogenic stressors: from the landslide-prone slopes of Wayanad destabilised by resort construction and the hydrological crisis in Mussoorie due to urbanisation, to the unique pollution metrics of equine waste and vehicular exclusion in the eco-sensitive zones of Matheran and Mahabaleshwar.

By quantifying impacts on slope stability, water quality, and biodiversity, this research aims to propose sustainable frameworks for balancing visitor influx with environmental resilience.

## HILL STATIONS IN PERIL? IMPACT OF TOURISM



Pratiksha Chalke

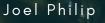


This project, hosted at MIT-WPU's Department of Environmental Studies, utilises mitogenomics to resolve the deep phylogenetic nodes of the genus Euphaea (Odonata: Euphaeidae).

While the Western Ghats hosts critical endemics like Euphaea cardinalis, E. thosegharensis, and the recently described E. wayanadensis, their evolutionary relationship with Southeast Asian congeners remains obscured by unresolved polytomies in single-gene trees.

By sequencing complete mitochondrial genomes and reconstructing time-calibrated phylogenies, this study aims to decipher the biogeographic split across the Palghat Gap and test hypotheses of ancient vicariance versus recent dispersal events in these montane stream specialists.

## PHYLOGENY & PHYLOGENOMICS OF EUPHAEA GENUS



#### **PROJECTS**

## Phylogeny & Phylogenomics of Euphaea Genus







Euphaea damselflies are beautiful, red and black colored insects occurring near fast-flowing montane streams. The group is spread across the Indo-Malayan region and is an evolutionary puzzle.

Photo courtesy: Tejas Mehendale



SPECIES
DISTRIBUTION
MODELING OF SRI
LANKA FROGMOUTH

Ameya's pet project employs Species Distribution Modelling (SDM) to delineate the fragmented ecological niche of the cryptic Sri Lanka Frogmouth (Batrachostomus moniliger) across the Western Ghats.

As a nocturnal species dependent on dense evergreen and moist deciduous understories, the Frogmouth is a sensitive indicator of forest integrity yet remains notoriously difficult to survey visually.

By integrating occurrence data with high-resolution bioclimatic and topographic variables, this study aims to predict suitable habitat distribution beyond currently known localities.

The research seeks to identify critical connectivity corridors and potential climate refugia, providing a spatial framework for conserving this endemic species amidst accelerating land-use change.



Ameya Deshpande



## WORKSHOPS & TALKS

In the year 2025, we conducted and were part of 15+ workshops and guest talks in national and international conferences. Our team also presented posters at various conferences.



















### WORKSHOPS & TALKS







Workshops & conference talks are our major contribution to science communication & outreach

#### WORKSHOPS & TALKS

Sr. No.	Name of the Place	Program	Program Title	Conference	Supported by	Month
1	Pondicherry	Invited Talk	Odonates as Ecological Indicators	WaterFest'25		February
2	Pondicherry	Workshop	Communicating Science	WaterFest'25		February
3	NCBS-TIFR, Bangalore	Invited Talk	Odonata Odyssey: Integrating Niche Modeling, Phylogenetics, and Genomics in the Euphaea Storyat Genomics Across Scales Conference	Genomics Across Scales		April
4	NCBS-TIFR, Bangalore	Workshop	Foundations of Odonatology	Genomics Across Scales	DS	April
5	Online	Invited Talk	Sacred Yet Scorned: Cultural lives and city struggles of owls*	Hindustan Times	NCF	April
6	Online	Workshop	Species Distribution Modeling	NA	PC	May
7	WII, Dehradun	Workshop	Conservation Careers	Indian Conservation Conservation		June
8	Melghat Tiger Reserve	Workshop	Capacity Building Workshop on Forest Owlet Research and Conservation for Frontline Staff	Part of Project	IV	July
9	Online	Workshop	EIA: Tools & Techniques	NA	MS, PK	July
10	SCCS Bangalore (IISc)	Workshop	Conservation Careers	SCCS Bangalore	SK	September
11	Shilim, Pune	Workshop	Capacity Building Workshop on Wildlife Research for Frontline Staff of Shillim Institute	Part of Project	KS, SK	October
11	Raimona National Park	Workshop	Foundations of Odonatology	with WTI & Assam Forest Department	JP	October
12	Pune	Invited Talk	Rethinking Urban Ecology	Part of Project	SK	October
13	Pench Tiger Reserve	Workshop	Odonata Spectrum: Diversity, Habitats & Conservation**	Wildlife Week, Pench TR	DP	October
14	Kalpetta, Kerala	Invited Talk	Past Climatic Fluctuations and Owlets of India	Wayanad Bird Festival		November
15	Melghat Tiger Reserve	Workshop	Capacity Building Workshop on Odonata Research and Conservation for Frontline Staff	Part of Project	DP. SG	November
16	PVG College, Pune	Invited Talk	Rethinking Urban Ecology & Conservation	International Conference on Niche Areas for Sustainable Development		November



## AWARDS & ACHIEVEMENTS

In the year 2025, our team published 07 papers, received numerous grants & awards



### **AWARDS & ACHIEVEMENTS**







Sr. No.	Name of Award	Team Member	Details	
1	Best Poster	Debangini Ray	SCCS 2025 Conference, Bengaluru	
2	MBZ Grant	Nikhil Kuni	Conservation grant towards study of rare Nolidae moth in Sikkim	
3	MIT-WPU Research Excellence	Dr. Pankaj Koparde	For outstanding work in wildlife research	
4	Maharashtra Gene Bank Grant	Dr. Pankaj Koparde	Conservation Action Planning for Upper Bhima River	
5	Consultancy Grant	Dr. Pankaj Koparde	Spider research and capacity building at Shillim Institute Pune	
6	Outreach Grant	Dr. Pankaj Koparde	Outreach for wetland conservation by EarthWatch Institute India	

#### **PAPERS**







We contributed to the discovery of five new species of dragonflies & damselflies this year! Big thanks to our research collaborators, including Dr Vivek Chandran, Dr Dattaprasad Sawant, and Dr Krushnamegh Kunte

## **OWLSOME PHOTOS**









#### RANDOM PHOTOS











## **KEY INSIGHTS**

#### **Strategic Project Expansion**

- CUL executed eight diverse conservation and research projects in 2025, addressing rivers, wetlands, protected areas, and urban ecosystems.
- All projects are aligned with UN SDGs 6, 11, 13, 14, and 15, emphasising water security, climate resilience, and biodiversity conservation.

#### **Community Engagement & Capacity Building**

• Extensive involvement of PBRs, BMCs, school groups, SHGs, and forest guards highlighted CUL's inclusive, participatory conservation ethos.

#### **Research Recognition & Output**

 The team produced seven publications, discovered five new species, received multiple grants and awards, and delivered 15+ workshops/talks.

### REFLECTIONS

The 2025 annual report reflects a **year of expansion, impact, and maturity** for Chatur Ullu Lab.

The diversity of projects, from river basin planning to species-level ecological assessments, demonstrates **an integrated approach to conservation** that blends rigorous science with meaningful community involvement.

Our team's ability to **work across landscapes** such as the Western Ghats, Northeast India, and urban Pune reveals both ecological breadth and institutional versatility.

A standout feature is the **consistent emphasis on capacity building and outreach**, recognizing that long-term conservation success depends on empowered communities and trained frontline personnel.

Equally significant is the **lab's investment in young researchers**, whose projects reflect emerging priorities, urban ecology, tourism impacts, phylogenomics, and species distribution modelling. Their achievements, awards, and presence at national platforms reinforce CUL's role as a nurturing research environment.

Overall, the year 2025 report conveys a forward-looking organization grounded in science yet deeply rooted in community stewardship.

## **CUL TEAM**



### REPORT CREDITS

#### Team Members (page 50 - row-wise, left to right)

Row 1: Krishnandu Sarkar, Ameya Deshpande, Arajush Payra, Nikhil Kuni, Shubhankar Khangar

Row 2: Debangini Ray, Pratiksha Chalke, Inshiya Vohra, Dhruv Parmar, Joel Philip

Row 3: Dhuva Bhatt, Dr Dipti Thakuria, Prosenjit Dawn, Shrikant Gund, Dr Smrithy Vijayan

Page 51: Dr Pankaj Koparde

#### **Our Collaborators:**

Dr Dattaprasad Sawant, Dr Vivek Chandran, Dr Krushnamegh Kunte, Shantanu Joshi, Dr Vidyadhar Atkore, Dr Prasad Kulkarni, Amila Sumanapala, Neha Mujumdar, Dr Vijay Barve, Dr Ashish Tiple, Dr Andrea Phillott, Dr Mangesh Bedekar, Arijit Jere, Reji Chandran, Vishnudas CK, Amey Paranjape, Jayanta Ganguly, Dr Rishikesh Tripathi

Content: Dr Pankaj Koparde, Shubhankar Khangar, Dabngini Ray

**Photographs:** All CUL team members (mainly Krishnandu Sarkar and Ameya Deshpande). Euphaea photos by Tejas Mehendale.





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