

ANNUAL REPORT

2021-22





The Ashoka Trust for Research in Ecology and the Environment (ATREE) completes a quarter-century of groundbreaking work in the field of conservation and sustainability. The immense knowledge we have gathered, and still generate across landscapes influences research in our domains. We need to tap the amazing potential this knowledge has to change and mobilise the public imagination.

The progress we have reported on was made possible by the generous support of our donors and partners. Conserving biodiversity is a collaborative effort and human partnerships, as mirrored in the natural world, are the key. Thank you for backing us.

1996



Ashoka Trust for Research in Ecology and the Environment (ATREE) is founded as a global non-profit organisation to generate interdisciplinary knowledge and inform policies and practices in conservation and sustainability.

The TN Khoshoo Memorial Award is instituted to honour the legacy of the world-renowned environmental scientist, Dr Triloki Nath Khoshoo.

2005



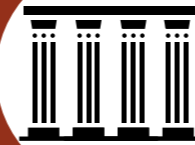
ATREE is honoured with the prestigious Dr A.P.J Abdul Kalam award for Environment Conservation by the Government of Karnataka.

ATREE launched a PhD programme in Conservation Science and Sustainability Studies. It also offers certificate courses for people working in the field of environment, conservation and sustainable development.



2009

2010



ATREE institutes the Centre for Environment and Development and the Centre for Biodiversity and Conservation in 2010. The Centre for Social and Environmental Innovation and the Centre for Policy Design respectively follow in 2019 and 2020.

ATREE receives the Distinguished Service Award from the Society for Conservation Biology, Asia Section, for its contributions to biodiversity conservation and capacity building for sustainable development in India.



2016

2019



ATREE receives the UNESCO Sultan Qaboos Prize for Environmental Conservation.

Launched Master's course in Conservation Practice. This applied an interdisciplinary course is curated to create the next environmental leaders.



2021

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Academy for Conservation Science and Sustainability Studies

Our Centres

- Rohini Nilekani Philanthropies - Centre for Environment and Development
- SMS Foundation - Centre for Biodiversity and Conservation
- Centre for Social & Environmental Innovation
- Centre for Policy Design

North-East Initiative

Our Community Conservation Centres (CCC's)

- Agasthyamalai: Kalakad-Mundanthurai Tiger Reserve (KMTR)
- Biligiri Rangaswamy Temple Tiger Reserve (BR Hills)
- Vembanad Community Environmental Resource Centre (CERC)
- Male Mahadeshwara Hills (MM Hills)

Our Initiatives

- The Alliance for Reversing Ecosystem Service Threats (AREST)
- National Mission on Biodiversity and Human Well-Being (NMBHWP)

TN Khoshoo Memorial Award

Financial Statement

Publications



ATREE's Strategic Focus

About ATREE

ATREE is founded as a global non-profit organisation to generate interdisciplinary knowledge and inform policies and practices in conservation and sustainability. At ATREE, we focus on applied science through research, education and action that influence policy and practice in the conservation of nature, management of natural resources and sustainable development. ATREE is recognised as a Scientific and Industrial Research Organisation by the Ministry of Science and Technology, Government of India.



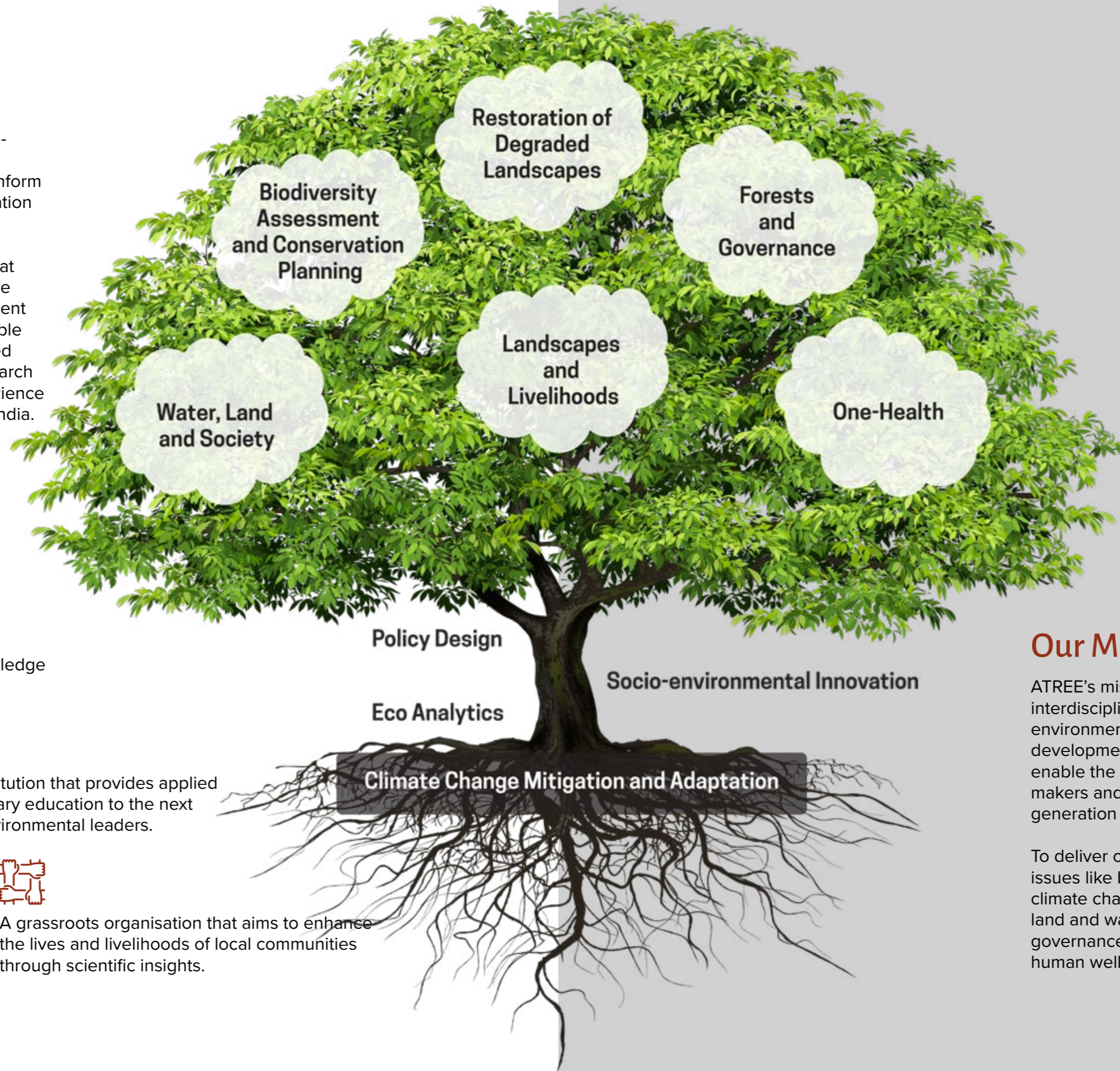
A think tank that provides policy coherence, interdisciplinary knowledge and institutional framework.



An academic institution that provides applied and interdisciplinary education to the next generation of environmental leaders.



A grassroots organisation that aims to enhance the lives and livelihoods of local communities through scientific insights.



Our Mission

ATREE's mission is to generate rigorous interdisciplinary knowledge for achieving environmental conservation and sustainable development in a socially just manner, to enable the use of this knowledge by policy makers and society, and to train the next generation of scholars and leaders.

To deliver on our mission, we work across issues like biodiversity and conservation, climate change mitigation and development, land and water resources, forests and governance and ecosystem services and human well-being.

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Delhi

PRESIDENT'S MESSAGE



Dr. Kamaljit S Bawa
Founder & President, ATREE

As ATREE celebrates its 25th anniversary this year, it's time to reflect on the past and ponder the future.

Over the last 25 years, ATREE, together with partners including local communities and government agencies, has tackled issues at the interface of environment, development, and society. We have demonstrated how interdisciplinary knowledge can be generated and applied to resolve pressing environmental problems through impacts on policy and actions at the grassroots level. To train the next generation of environmental leaders, who our country urgently needs, we have built an Academy offering PhD and MSc degree programmes.

Our work has fundamentally changed the discourse on biodiversity conservation by proposing and implementing models of governance that assign primacy to human rights while still protecting nature. We convened a consortium to develop a road map for a National Mission on Biodiversity and Human Wellbeing, an initiative to link biodiversity conservation with sustainable development.

The next twenty-five years will pose new and continuing challenges, including the degradation of our ecosystem, extreme climate disasters, increased incidence of zoonotic disease, hunger and pollution. The stakes are high for humans and non-humans alike, and ATREE will continue to adjust and expand its programmes to work towards making a sustainable future a reality.

Like trees of old around which communities were built, ATREE seeks to be a nucleus that connects people, the planet and effective action. It is an ecosystem of diverse people, a habitat for ideas and a synthesiser of programmes to lead to a better future.

We remain deeply grateful to our donors for providing the core support that allows us to think big. We particularly thank Rohini Nilekani, the Shibulal family, Anthony Killough, Sandeep Singhal, S. Viji, Vasudev Rao, Chitra Phadnis, Ajit Issac, Balachander Ganesan and the others mentioned in this report. We also thank our numerous friends for their encouragement and support.

DIRECTOR'S MESSAGE



Dr Ravikanth G
Acting Director, ATREE

What a wonderful journey it has been! This year, as we celebrate 25 years of work, we renew our commitment to nurture and protect biodiversity and rededicate our pledge to environmental conservation and sustainable development. We continue to be ranked as one of the leading environmental think-tanks globally. The highlight, however, is the inception of our Master's Programme.

As an academic institution of repute, we now offer an appealing interdisciplinary Master's Environmental Studies course in Conservation Practice, jointly with The University of Trans-Disciplinary Health Sciences and Technology (TDU). This unique programme equips students with knowledge, perspectives, and skills to understand and address conservation challenges.

In 1911, British colonialists, while mapping the Siang Valley of Arunachal Pradesh, documented many plant and animal groups that were published in several scientific publications. This year, a large team from ATREE along with FELIS Creations repeated the expedition after 110 years, to compare the current biodiversity (including plants, herps, molluscs, insects, fishes and mammals) to that reported 100 years ago.

We are also excited to announce that a new genus of Braconid wasp, discovered this year, was named Atree and the new species, Atree rajathae. The species was named after ATREE's 'Rajatha Jubilee' (25th anniversary). It is probably the first time in India that an institute has got its own insect genus!

This year, ATREE's Agasthyamalai Community Conservation Centre (ACCC), Manimuthar, was awarded the prestigious Green Champion Award 2022 by the Government of Tamil Nadu. Prof. Kamal Bawa, was elected as an International Member of the U.S. National Academy of Sciences for his extensive contributions to the science of sustainability. We are also pleased and excited about two young members joining the ATREE faculty.

We thank all our donors for their support in the last 25 years that has helped us grow from strength to strength. Finally, we would take this opportunity to thank our outgoing Director, Dr. Nitin Pandit, who carried us through the difficult phase of the pandemic. It has been a great and eventful year, and we look forward to taking ATREE to greater heights in the coming years.

OUR DONORS

ENDOWMENTS AND RESEARCH GRANTS

Rohini Nilekani, India	The Ford Foundation, USA	S.D. Shibulal and Kumari Shibulal, India	ATREE Belmont, USA
Sehgal Family Foundation, India	Bawa Family, Belmont, USA	Sarojini Damodaran Foundation, India	Raj Khoshoo and Mohini Khoshoo, USA
SDTT-ATREE CF (Tata Trusts), India	Oak Foundation, Switzerland	Centre for Interdisciplinary Studies in Environment and Development, India	Barr Foundation, USA
Rani Dalbir Chaudhary, India	L. Vasudeva Rao, India	Arghyam Foundation, India	Kasturi Trust, India
Jayshree and Ganesan Balachander, India	T. R. Narayanaswamy and Meena Narayanaswamy, India	Govt. of Karnataka (Abdul Kalam Award), India	TVS Motor Company, India
Sharachchandra Lele, India	TVS Motor Company, India	SMS Foundation, USA	ATREE, India

RESEARCH GRANTS - RUNNING GRANTS

West Bridge Advisors, India	Anthony Killough, USA	Chris Davidson, USA	Sundaram Finance, India
Brakes India, India	Devdutt Yellurkar, USA	National Geographic Society, USA	NortonLifeLock India (Symantec Software India), India
Tata Trusts, India	University of Kassel, Germany	Kumaon Advisors LLP	Rufford Small Grants Foundation, UK
Indian Council of Forestry Research and Education, India	National Mission on Himalayan Studies, India	Science & Engineering Research Board, DST, Govt. of India	Council of Philanthropies for Climate Action, India
Ministry of Earth Sciences, Govt. of India	Office of the Principal Scientific Advisor to the Govt. of India (National Biodiversity Mission), India	Centre for Interdisciplinary Studies in Environment and Development (CISED)	Ministry of Environment, Forest and Climate Change, Govt. of India
Antrix Corporation, India	American Jewish World Service, USA	SayTrees Environmental Trust, India	London School of Hygiene and Tropical Medicine, UK
Aroon Raman, India	United Nations Educational, Scientific and Cultural Organisation, India	National Medicinal Plants Board, India	Pel Drukpa Charitable Trust, India

RESEARCH GRANTS - RUNNING GRANTS

Advanced Centre for Integrated Water Resources Management, Govt. of Karnataka	Utrecht University, Netherlands	Azim Premji Philanthropic Initiatives (APPI), India	Institute of Bioresources and Sustainable Development, India
Bengaluru Sustainability Forum, India	Wellcome Trust – DBT India Alliance, India	G.B. Pant National Institute of Himalayan Environment, India	Department of Ports, Kerala
Zoological Society of London, UK	Tides Foundation, USA	Pacific Institute	World Wild Fund for Nature, India
Oriental Bird Club, UK	Indira Gandhi National Forest Academy, India	Alliance of Religions and Conservation, UK	National Bank for Agriculture and Rural Development, India
United Nations Development Programme, India	Namsaling Community Development Center (FK Norway)	U K Centre for Ecology and Hydrology, UK	

NEW DONORS - YEAR 2021 - 22

McGovern Foundation, USA	Ministry of Micro, Small & Medium Enterprises - Scheme of Fund for Regeneration of Traditional Industries (MSME-SFURTI)	SMS Foundation, India	Aquaya Institute, USA
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Industrial Credit and Investment Corporation of India-ICICI, India	International Water Management Institute-IWMI, Srilanka	Give Foundation, India	Rainmatter Foundation, India
Nudge Foundation, India	Save the Pangolin, USA	University of Edinburgh, Scotland	Synchronicity Earth, UK
Unitarian Universalist Association (UUA), USA	Swiss Federal Institute of Aquatic Science and Technology (EAWAG), Switzerland	The Conservation, Food and Health Foundation	Norton Lifelock India Pvt Ltd.

In **2022**, ATREE's Agasthyamalai Community Conservation Centre (ACCC), Manimuthar, has been awarded the Green Champion Award 2022 by the Government of Tamil Nadu.

In **2012**, Dr. Kamaljit S Bawa won the **first Gunnerus Sustainability Award** in recognition of ATREE as an **Innovative, knowledge-based conservation and research organisation for sustainability science.**

In **2020**, ATREE's 'Weeds to Wealth' project was awarded the **iF SOCIAL IMPACT PRIZE.**

In **2005**, the **Government of Karnataka** honoured ATREE with the prestigious **Dr A.P.J Abdul Kalam award for Environment Conservation** for its outstanding contributions in **environmental conservation and management.**

In **2020**, ATREE was ranked **#14** for **Water Security Think Tanks** and **#20** for **Environment Policy Think Tanks** in the world.

ATREE has been **certified as equivalent to a U.S. public charity** by the **NGO Source.**

In **2019**, ATREE became the **first Indian organisation to receive the prestigious UNESCO Sultan Qaboos Prize for environmental conservation.**

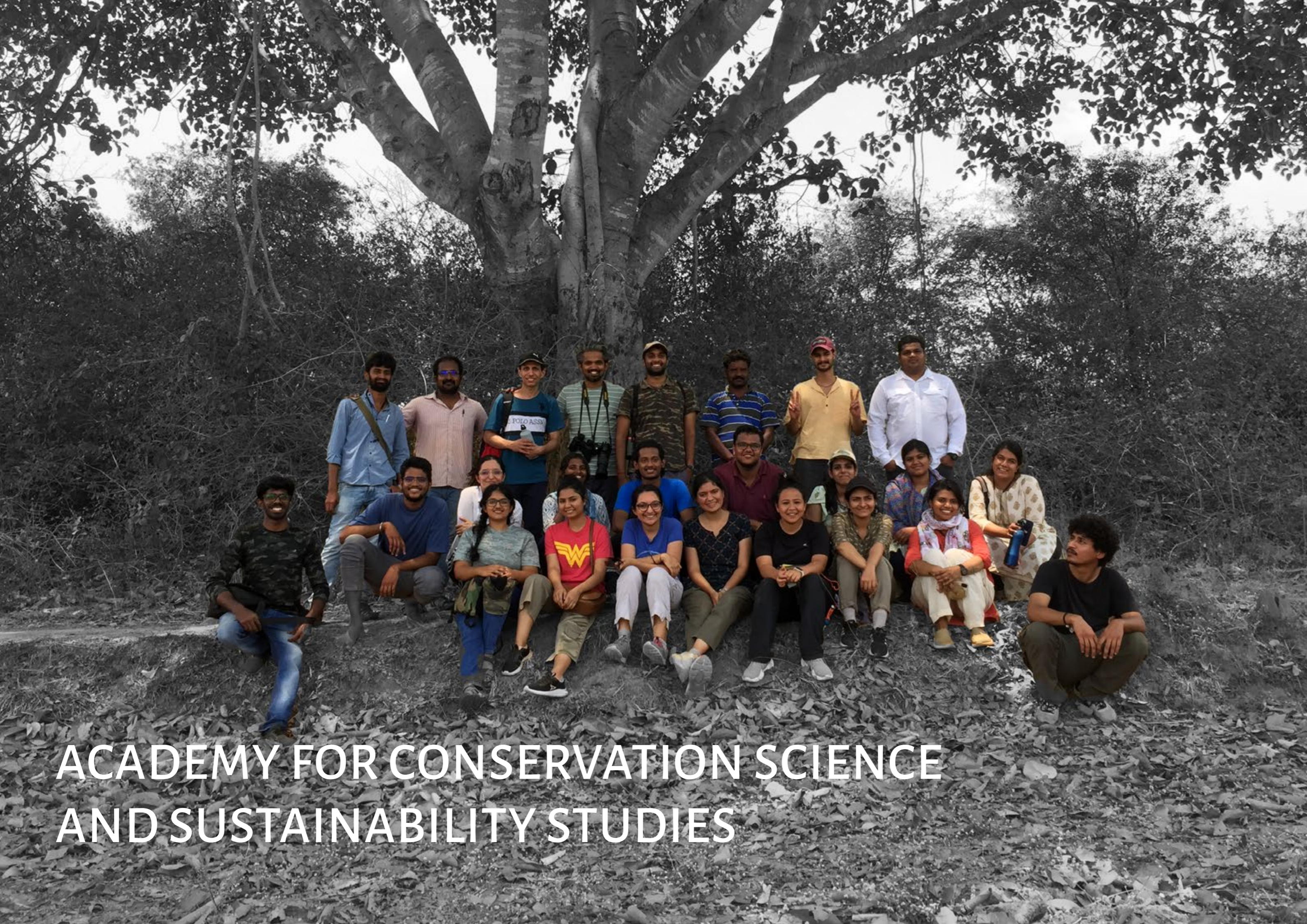
ATREE has won the prestigious **GuideStar India Transparency Key award** and has joined **India's largest pool of credible NGOs** after undergoing a rigorous, due diligence process.

In 2019, the **UPENN Index Report** ranked **ATREE #17** among the **World's top Water Security Think Tanks.**

In **2016**, ATREE received the **Distinguished Service Award** from the **Society for Conservation Biology (SCB)** Asia Section, in recognition of ATREE's extraordinary contributions to the **conservation of biodiversity and capacity building for sustainable development in India.**

GuideStar India's Transparency Key is the **Foundation Level certification**, indicating that the organisation has filed annual income tax returns as a tax-exempt entity and has shared the same in the public domain.





**ACADEMY FOR CONSERVATION SCIENCE
AND SUSTAINABILITY STUDIES**

49

PhD Students

17

Faculty

02

PhD pre-submissions

06

Synopsis presentations

35

PhD Degrees awarded

52

Interns

20

Student publications

(Peer-reviewed journals and popular articles)



PhD Recruitment 2021

In 2021, the Academy, for the first time, admitted students with Central Government scholarships (i.e. the CSIR-JRF, UGC-JRF and DST-INSPIRE) to the Doctoral Research Programme in Conservation Science and Sustainability Studies. Students with training in any branch of social, natural, or engineering sciences were eligible for admission to the PhD programme.

An interview panel conducted a rigorous 2-stage evaluation of all the candidates and selected five based on their:

- Subject competence,
- Aptitude for research and
- Potential fit with ATREE programme.

Launch of MSc. Environmental Studies (Conservation Practice) programme

The Academy, in collaboration with the Transdisciplinary University (TDU), launched a Master's Environmental Studies course in Conservation Practice on October 01, 2021. Twenty-two students were admitted to the first batch.

The programme equips natural and social science students with interdisciplinary knowledge, perspectives and skills to understand and address conservation challenges. The course is curated to create young environmental leaders whose interdisciplinary skills will add value to corporate social responsibility and sustainability offices, development and conservation NGOs, and government departments dealing with environment and development portfolios. In academic institutions, these leaders will lend a practical edge.

Besides foundational knowledge in social and natural sciences, our graduates will accumulate domain knowledge and skills across a spectrum of conservation and sustainability themes and sectors ranging from forests and farms; biodiversity, ecosystems services and human well-being; environmental ethics and social justice; policy, governance and impact assessment; ecological restoration and landscaping; climate change; and field and machine learning technologies. A wide range of competencies in these fields make our graduates competitive and sought-after candidates for roles in conservation and sustainability initiatives across the country.



Certificate courses, workshops and seminars

The Annual Work Seminar (AWS), an internal biennial event organised by PhD students, is a platform for ATREE students, researchers and staff to share their ongoing work, discuss future project ideas and celebrate interdisciplinarity. Open to faculty, students, research associates and representatives of ATREE's Community Conservation Centres, it provides a space to discuss achievements, work findings and potential work proposals with the larger ATREE community. The overarching theme for the fifth edition of AWS (August 24 to 26, 2021) was ATREE@25.

In 2021, the Academy organised three certificate courses and training workshops comprising the NGO attachment for Indian Forest Service Probationers (2022 batch), the Seminar on Himalayan Sustainable Development and Conservation at the Naropa Fellowship (Ladakh) and the Management Development Program in Integrated Water Resources Management (IWRM) for Karnataka State Water Resource Engineers and Managers of the Irrigation Department.

ATREE is a partner of the Cluster of Cooperation (CLOC) Knowledge to Action (K2A) in South Asia, a "public good" open to Swiss and South Asian institutions interested in partnering to promote Sustainable Development Goals (SDGs) in South Asia and Switzerland through research and education. The Academy helped organise the K2A online academy 2021 to build skills enabling participants to contribute to and take leadership in the achievement of the SDGs, with a special focus on climate change, waste management and biodiversity.

The Academy organised its third Student Annual Seminar (SAS) from February 4 to 6, 2021. The SAS provides students a platform to present their research progress to their peers and faculty (especially outside their Doctoral Advisory Committee).



**ROHINI NILEKANI PHILANTHROPIES - CENTRE
FOR ENVIRONMENT AND DEVELOPMENT**

Community Forest Resource (CFR) Potential WebGIS for Central India

This project involved the development of a geoportal designed to make publicly available maps of 'CFR potential areas', areas that can be claimed by forest-dwellers in central India as Community Forest Resource (CFR) rights areas under the Forest Rights Act, 2006. It can be accessed at <http://cfr.atree.org/potential/cfr.php>.

The WebGIS displays maps for Maharashtra, Jharkhand, Madhya Pradesh and Chhattisgarh states. For comparison, it also presents, where possible, information on 'CFR potential realised', i.e., which of the villages have received CFR rights, of what kind and over how much area. Some of the main features are different boundary layers, village search function, ability to switch between Google and Bing base maps and measure tool.

By developing and making publicly available the village-wise maps of CFR potential, however approximate they might be, we ensure that policymakers, civil society groups, officials and the wider public become aware of the extent of CFR potential and its location across an entire state, the gap between the potential and CFR claims actually granted, and the regions requiring attention. We also hope that WebGIS will make people more familiar with the forested landscape of central India in terms of the location of settlements, the composition of villages, revenue and (where possible) forest boundaries, and the land-use data.

This project was funded by Bharat Rural Livelihoods Foundation and led by Dr Sharachchandra Lele. The WebGIS work was carried out by Shiva Subramanya S. with contributions from Arushi Khare, Shruti Mokashi and Pallavi Tyagi.



WebGIS portal displaying district (black), tehsil (blue), village (red) and forest compartment (green) boundaries in Chhattisgarh state.



SEQ Figure 1* ARABIC 2: WebGIS map showing CFR recognised villages (pink) and CFR potential villages (yellow) in western Maharashtra.

Analysing the transformative potential of CFR

Recognising the right of Gram Sabhas to manage their CFRs is one of the path-breaking provisions in the Forest Rights Act, 2006. This study, supported by The Nudge Foundation, aims to understand whether and under what conditions these CFR rights can realise their transformative potential, i.e. enhance livelihoods equitably, empower communities and conserve/regenerate forests. The team comprising Dr Sharachchandra Lele, Dr Shruti Mokashi and Dr Atul Joshi has been carrying out this study in 6 villages in eastern Maharashtra and working in partnership with Civil Society Organisation (CSO) that have supported these villages. The team conducted vegetation sampling, interviews and focused group discussions to address these questions. The preliminary analyses show that the study villages have adopted proactive protection measures such as a ban on hunting, wood cutting, grazing and fire, though the extent of implementation of these measures varies across the villages.

The study villages, through the adoption of these protection measures, have been successful in enriching the biological diversity of their CFR areas and in livelihood enhancement of villagers. The villages with highly degraded vegetation in their CFR had to invest extensively in terms of plantations and soil and water conservation to restore their lost biological diversity and enhance the livelihood generation potential whereas the villages that had relatively less degraded vegetation in their CFR adopted only protection measures to manage their forest resources. The CFR management has also led to progress in the democratic functioning of the Gram Sabhas through the active participation of villagers. The local NGOs and collectives such as Self Help Groups and Gram Sabha Federations have been playing an important role in facilitating sustainable CFR management.

Co-management under DBT-funded project

As many as 341 (243 men and 98 women) Soliga tribal NTFPs harvesters participated in the co-management meetings. Threats to the forest and community-based management solutions were discussed and identified. The drivers of biodiversity change identified by the community are fuelwood collection by outsiders, lantana spread, forest fire, hemiparasite and human-wildlife conflict. The workshop and interactions organised with the Karnataka Forest Department (KFD) were attended by 55 officers. The meetings focused on co-management and forest conservation issues. Topics related to conservation, livelihoods and governance, and management were discussed. Issues identified: Human-wildlife conflict, fire, invasive species and habitat loss. A site-specific forest conservation action plan developed through community participation is in the offing.

Nature's contribution to poverty alleviation, human wellbeing and the SDGs (Nature4SDGs)

The Nature4SDGs project is a 3-year collaboration between ATREE, King's College London and Stockholm University to understand the complex interactions between people and ecosystems in the context of achieving the Sustainable Development Goals (SDGs). We compiled fine-grained social-ecological datasets from nine previously completed research projects, covering 12 sites across ten countries, most of them supported under the Ecosystem Services for Poverty Alleviation (ESPA) programme of the UK Government. The data analyses provided deeper insights into the relationships between access and use of wild harvests from uncultivated ecosystems (forests, savannas and fisheries) and multidimensional human wellbeing.

- Using geospatial data to extrapolate from our datasets, we estimated that ~719 million people directly harvest wild resources (Fig.1), including in converted landscapes close to cities, with higher prevalence among poorer people.
- We also found that food security and life satisfaction of households engaging in wild harvesting improve with access to material assets, skills and infrastructure.
- Wild harvest is an important livelihood source for the rural poor, although rich households derive higher absolute income from uncultivated resources where it is abundant.
- Income derived from such resources reduces inequality when the resource is community regulated and extraction involves labour-intensive techniques.

Our results support calls to maintain access to wild resources use and ensure community regulation, alongside improving equitable access to services, infrastructure and markets.

Nature4SDGs was funded through the 'Towards a Sustainable Earth' (TaSE) programme, jointly by UK Research & Innovation councils, the Department of Biotechnology, India and the Swedish Research Council for Sustainable Development, Formas.

Restoration of Hennagara Lake

Hennagara Lake is a man-made tank in Anekal Taluk in the Bangalore South Urban district of Karnataka. Spread over an area of around 133 ha., the lake is surrounded by the villages of Jigani, Rajapura, Masthenahalli, Seethanayakanahalli and Hennagara. The catchment area of the Lake includes the Jigani Industrial area, a hub for major pharmaceutical and electronic industries. Hennagara Lake falls under Class D based on Water Quality Criteria with a high total Coliform count and high BOD and COD. In the absence of quantitative criteria for beneficial use, the state auditing authority considers the attainment of Class B (outdoor bathing) as a benchmark for evaluating the impact of interventions on lake water quality. This requires huge investments and is economically not feasible, especially in the context of urban lakes that largely receive treated/partially treated effluents. It is crucial from the start to set realistic restoration goals with respect to biodiversity, flora and fauna, stakeholder perceptions, livelihoods and water chemistry based on stakeholder consultation and baseline monitoring data. Conventional DPR focuses just on the water quality and ecologically un-informed landscaping. What we are proposing is a comprehensive approach that considers the lake as a socio-ecological system with multiple stakeholders and a restoration goal that encompasses water quality, biodiversity and multiple ecosystem services.

Improved water quality, enhanced biodiversity and ecosystem services, and behavioural change among stakeholders can lead to the sustainable management of the lake.



REAL–Water programme to expand the rural water services knowledge base

The objective of the USAID-funded Rural Evidence and Learning for Water (REAL–Water) programme is to achieve safe, equitable and sustainable rural water supplies in low- and middle-income countries. ATREE–CSEI, a sub-awardee for this project, is looking at the Improved Planning for Water Resources Management. Specifically, the research team is trying to answer questions such as where and how the systems are under threat through contamination and scarcity, how holistic water resource management is being planned and what the barriers and enablers, costs and benefits are of a successful management plan. Institutional mapping and journey mapping exercise is on in Ramanagara district, Karnataka.



**S M SEHGAL FOUNDATION - CENTRE FOR
BIODIVERSITY AND CONSERVATION**

Bio-resources and sustainable livelihood in Northeast India

A brief description

In coordination with the Institute of Bioresources and Sustainable Development, ATREE partnered with a range of institutions in the Northeast to strengthen science and sustainable development in the region. The project, sponsored by the Department of Biotechnology (DBT), aimed to explore, discover and document bioresources of the region, assess their economic importance to the regional economy, develop models of sustainable resource use based on discoveries, develop products based on indigenous knowledge, build capacity and strengthen institutions across the Northeast in biodiversity science.

Project outcomes

Mapping and monitoring biodiversity: We attempted to map and quantitatively assess the geographic distribution and population status of plant and animal resources in the region. From the data collected so far, we have estimated, plotted and mapped species richness and abundance across the different taxa. For flowering plants, we analysed and mapped the cumulative patterns of species richness and abundance for the entire Northeastern region. Of 229 grids sampled, we enumerated about 1753 tree species. Shrub species recorded were about 856. Similarly, we recorded 151 individuals of edible insects, the highest number of species being from the order coleopteran (34), hymenoptera (32) and hemiptera (26) and less than 20 species from the remaining order. The database of snails suggests that there are 512 species of land snails in Northeast India. Until now, 105 species belonging to 17 families and 39 genera have been identified, and more than 32 species are yet to be identified. We carried out a number of workshops and training programmes for students, teachers and the general public regarding the bioresources of the NE region.

Endemicity and radiation in waterfalls of the Western Ghats:

The genus *Cremnoconchus* (Gastropoda: Littorinidae)

A brief description

The freshwater molluscs of the genus *Cremnoconchus* are the only freshwater members of the marine gastropod family Littorinidae. The species *Cremnoconchus* is endemic to the spray zones of the waterfalls in the Western Ghats of India. To date, the genus *Cremnoconchus* consists of nine described species restricted to spray zones of the waterfalls. The project attempted to resolve the phylogenetic relationship between the different species of *Cremnoconchus* and the timing of diversification in the Western Ghats, and to identify the number of putative species in this group.

Project outcomes

The molecular dating analysis revealed that *Cremnoconchus* diverged from its marine relatives around 90.40 million years ago.

The break-up of Gondwana or fluctuating sea levels might have facilitated the diversification of *Cremnoconchus* from its marine ancestors.

Molecular species delimitation analysis revealed 12 potentially undescribed species in the *Cremnoconchus* genus.



Team: NE bioresource

Investigating the performance of Miyawaki forests across an age spectrum in Bangalore urban district (Karnataka)

A brief description

Forest patches created through the Miyawaki method, a technique aimed at balancing the current edaphic and ecological conditions to mitigate the climate crisis, are gaining widespread popularity. Based on the principle of 'restore native forests through native trees', these forests are extremely dense, biodiverse patches planted and maintained through local stewardship. However, there is a clear lack of subsequent scientific monitoring and evaluation of the ramifications of these interventions. Thus, there is little understanding of the ecological outcomes and widespread unscientific success and failure narratives about these forests.

Our study involves vegetation surveys, assessments of soil and canopy metrics and inventorying of carbon assets of spatially similar Miyawaki forests across an age spectrum in Bengaluru and its peri-urban areas. These patches are mostly surrounded by semi-arid and dry sub-humid seasonal croplands and built-up areas. Vegetation and canopy analyses are being conducted through plot quadrats and photogrammetric tools, and soil and biomass carbon storage are being measured to understand the ecosystem services and effects of these interventions.

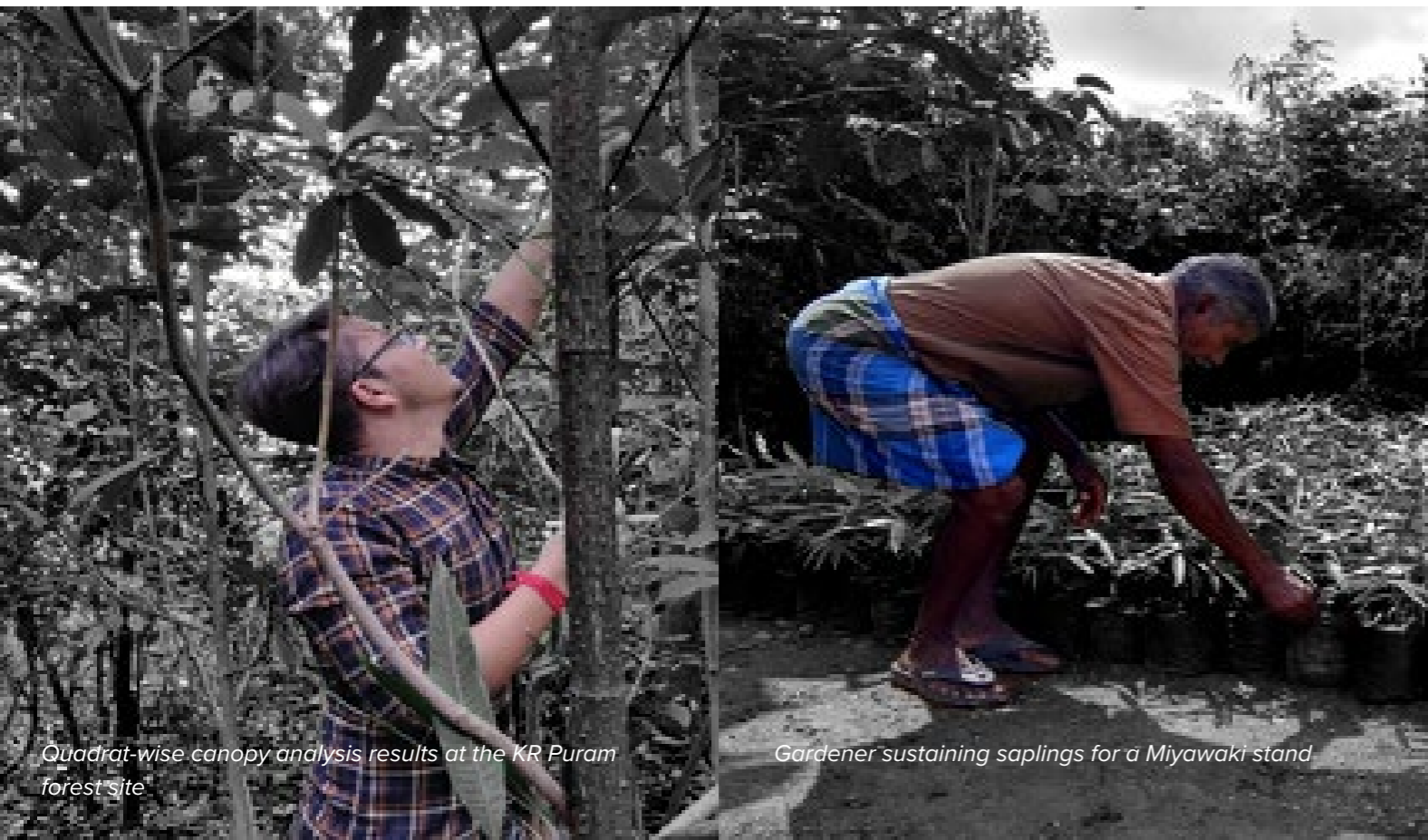
Project outcomes

The initial findings suggest that the proliferation of Miyawaki forests in the study region is associated with high sapling survival with poor natural recruitment of forest plant species at the forest floor and sub-canopy levels. Canopy closure in the older stands was consistently above 90%, likely due to the three-year stand monitoring protocol, but was also responsible for very slow litter degradation and poor herbaceous recruitment. It is a long-term project; thus, we seek further inquiries into multiple socio-ecological factors. Based on the primary outcomes, silvicultural modifications like coppicing, pruning and maintaining age diversity are recommended to the stands.

Exploring the underexplored

Insects are vital for several ecosystem processes and they respond readily to subtle changes in the ecosystem. It is imperative to understand their responses to various ecosystem processes. The Insect Biosystematics and Conservation Laboratory of ATREE undertakes the inventory of several lesser known and functionally important insect taxa like ants, dung beetles and several families of Parasitic Hymenoptera (Chalcidoidea and Ichneumonoidea) in the underexplored western and northeastern regions of India through field explorations and monitors the ecologically important insect taxa. Twenty-six new species were described during the year 2021–22, including **22 species of parasitic insects and four species of ants**. Of the three new genera described during this period, one was named *Atree*, commemorating **ATREE's 25th anniversary**.

The team has published an article on how the edge area influences insect colonisation in forest fragments under restoration and two others on how ant diversity responds to elevational variations and what factors are driving ant diversity.



Quadrat-wise canopy analysis results at the KR Puram forest site

Gardener sustaining saplings for a Miyawaki stand

Seed dispersal by rhesus macaques across a gradient of anthropogenic interference



The provisioning of non-human primates (primates henceforth) is a socio-cultural tradition across South and Southeast Asia. It may occur directly by hand-outs or inadvertently through discarded food at garbage dumps or crops in agricultural fields. The rhesus macaque *Macaca mulatta* is categorised as a ‘weed’ macaque due to its dependence on ‘human activities for a substantial portion of its diet.’ However, studies have shown that certain populations are highly frugivorous and effective seed dispersers for many plant species.

We examine how fruit consumption, including the diversity of fruit species in the diet of rhesus macaques, varies across groups with differing levels of dependence on anthropogenic food resources. Our study, located in Buxa Tiger Reserve, West Bengal includes three groups: one completely dependent upon natural resources (Group C), one provisioned by tourists for a part of a year (Group D) and one consuming crops in addition to natural foods across the year (Group P).

Project outcomes

Preliminary observations suggest that Group C consumes the most amount of fruits, followed by Groups P and D (Fig. 1).

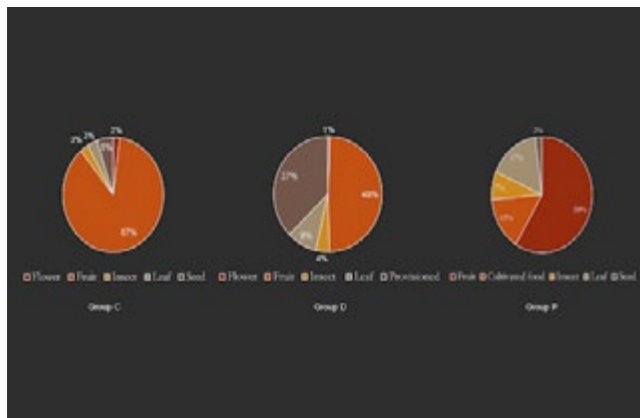


Fig.1 - Group C is largely frugivorous; group D consumes the least amount of food

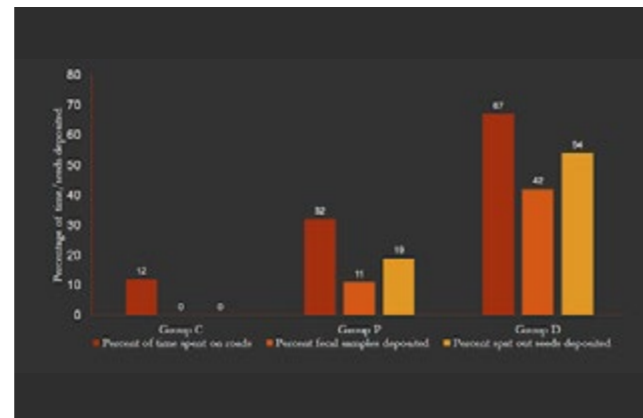


Fig. 2 - Group D spends a larger proportion of time on motorable roads and deposits many seeds there – being deposited on roads precludes seed germination.

Group D spends the most amount of time on roads as individuals in the group are used to having food thrown at them from vehicles passing by whereas Group C spends the least amount of time in human modified habitats. This has implications for their role as seed dispersers – Group D deposits many seeds on motorable, tarmac roads with heavy traffic that are unconducive for germination (Fig. 2).

We suggest that it is essential to reduce provisioning and to plant macaque-preferred fruiting species at the forest-agricultural land ecotone to ensure that the macaques continue to consume natural fruits and reliably disperse the seeds of a wide gamut of plant species in the Anthropocene.

Insects for food security



- Insects are the most promising and sustainable food resource to cater to the nutritional requirement of the future. Though the consumption practice is deeply rooted in the ethnic culture and widely practised in Northeast India, this rich knowledge is not yet documented properly.
- ATREE's insect lab has documented 300 species of insects consumed by the various communities living in NE Indian states and prepared a database integrating the species information containing updated name string of the species, high definition Infocus Image, diagnostic description and distribution, uses, associated traditional knowledge, use profiles, harvesting methods, market chains, various threats and a bibliography.
- Two insect orders (Megaloptera and Trichoptera), 40 genera and 60 species are the new additions to edible groups globally.
- Tapping the potential of insects as a bioresource by commercial rearing and domestication techniques can help to enhance rural livelihoods and reduce the pressure on the wild insect population, thereby resulting in insect conservation. The lab developed a low-cost rearing method for edible cricket *Teleogryllus mitratus*. Household kitchen wastes contribute to ~8% of GHG emissions. We developed a Biopod for rearing Black soldier flies *Hermetia illucens* in household kitchen waste and popularised it among the community.
- The lab also has produced three video documentaries on entomophagy practices.



**CENTRE FOR SOCIAL
& ENVIRONMENTAL
INNOVATION**

Community Building

As an impact ecosystem builder, we cannot afford to engage in unidirectional communication. Our communication needs to speak out but also listen in.

We need to listen, connect and build consensus across key actors through events, training and workshops. Across the initiatives, we have to create an engaged community of stakeholders to help move our collective goals forward. Additionally, there is a need to communicate our work effectively to engage current and potential partners/donors. We will do this using

blog posts, media articles, and graphic and video content through the website and our social media channels.

The community building team at CSEI enables communication to help initiatives focus on engaging their core communities. We engage with communities of practice to build a network that amplifies messages, shares best practices and builds common resources. To achieve impact, we document the present, trace our progress, synthesise our learnings and identify trends over time.



Farms and Forests Initiative

The Farms and Forests Initiative (previously Food Futures and Invasive Species Initiative) started with the objective of scaling ATREE's lantana work. It soon became clear that if the goal was to restore lantana-infested landscapes at scale (~3 crore acres), we needed to go from a livelihood-generation approach to a landscape-restoration approach. We had to move from artisanal to commercial use of lantana where the whole plant could get used in much larger quantities.

However, we are currently limiting our role to showing proof of concepts for lantana removal/restoration at scales ranging from 50 to 250 acres. However, we plan to sit with experts to come to a consensus on best practices, create a business case to show financial feasibility for lantana removal and restoration, and work with incubators/accelerators to help create more restoration companies across India that could apply for government tenders.

Cities and Towns



The Cities and Towns initiative (previously Green Cities) aims to ensure higher rates of reuse of treated wastewater in the domestic context, i.e. apartment complexes.

The initiative started with the intention to make cities greener and more climate resilient. But we soon realised that using freshwater for greening could be devastating for cities like Bengaluru that are vulnerable to water stress because of rapid urbanisation. The treated wastewater could not only be used for greening Bengaluru, but also for construction (a water-intensive industry) and, if treated properly,

for recharging aquifers and storing water in lakes. If the treated wastewater generated in Bengaluru was reused for construction activities alone, it would save the city 25% of its available freshwater.

Many tier-2 cities do not have the resources to address these challenges. Small towns approached us for help in creating circular water systems – a more effective way of rainwater harvesting and wastewater reuse. We brought small towns into the fold as we saw the opportunity to bypass the current trajectory to a more sustainable urban growth path.

Research and Development



The Research and Development team focuses on the second-degree impact on broader ecosystems that could lie outside CSEI's immediate scope.

It has two objectives. It acts as an internal service provider to our two initiatives by answering specific questions for them such as how much carbon might be sequestered or water saved if a specific approach is adopted,

what tools or standards exist or whether a particular solution is actually effective.

The team also generates knowledge products that boost conversations. It may include creating data products, capacity-building programmes or tools. To achieve this, the team will collaborate with other knowledge players including universities, start-ups, think tanks and Research and Development teams of companies.

CENTRE FOR POLICY DESIGN



Sustainable and Health Food Systems (SHEFS)

SHEFS is a global research programme funded by the Wellcome Trust with three-country case-study sites: the United Kingdom, South Africa and India. The project focuses on the intersection of food, sustainability and health in food systems. SHEFS, with the goal to optimise food systems without sacrificing sustainability or health values, is active in Bengaluru, BR Hills, Baramati, Sikkim, Banni, southern Indian peri-urban spaces, Western Ghats, western Indian arid grasslands and the eastern Himalayas. Currently, the focus is on formulating and translating policies to engage with the government and non-government players, which are being executed through:

1. Policy Impact Pathways Workshops: They were conducted in 4 phases from 2018 to 2022, including engagements with farmers to promote regenerative agricultural practices in the Bengaluru Rural region and a study to understand the antimicrobial resistance developed through poultry farming.
2. Drivers Pressures, State and Impact (DPSIR) mapping
3. Network analysis mapping various stakeholders at the local, state and national levels who have influenced policy implementation at multiple levels for years.

Political Economy of Natural Climate Solutions in India

The CPD is collaborating with The Natural Conservancy (TNC) to carry out a study on the Political Economy of Nature Climate Solutions (NCS) in India. The study looks at NCS such as restoration, reforestation, avoided deforestation and trees in farmland through the lens of political economy. The focus is on understanding and implementing high-impact policy routes for NCS in India. The focus areas are the western Himalayas (Himachal Pradesh), the eastern Himalayas (Sikkim), the Western Ghats (Karnataka), the Deccan Plateau (Maharashtra), and the Northeast (Assam).

Policy Engagements

1. Cop26: Participated as a stakeholder in sessions on Nature-Based Solutions and Pathways for Indian ecological restoration in COP 26 held in UK, 2021. Co-designed and led 4-panel discussions in the Nature Pavilion on issues including financing and scaling-up Nature-Based Solutions.
2. MoEFCC: Engaged with the Ministry of Environment, Forest and Climate Change at multiple fronts in the field of ecological restoration and presented best practices for the same.
3. National Steering Committee: Invited to serve on the National Steering Committee for the Global Environment Facility's (GEF) 7th Operational Phase of its Small Grants Programme in India (SGP-OP7).
4. Engaged actively with Karnataka's MGNREGA commissioner to influence NREGA policy to expand its engagement in ecological restoration strategies.
5. Wildlife (Protection) Amendment Bill, 2021: Coordinated and collated comments on the bill in partnership with the Metastring Foundation.

Knowledge Outputs

The CPD has been extensively involved in the production of a policy brief on scientific evidence of tree plantation and published material on Banni Grassland Reserves as the best practice of conservation in the global repository of case studies of FAO and UNEP, which highlighted our effective systems thinking methodology and transdisciplinary learnings, as well as our restoration efforts in the region.

The CPD has initiated multiple communications campaigns to highlight the hazards of mass tree plantation through popular articles, comic strips and animations. The CPD is actively engaged with grassroots-level organisations to co-create and scale-up restoration in India.



THE NORTHEAST INITIATIVE



Conserving the Critically Endangered White-bellied Heron *Ardea insignis* (Hume) in Northeast India.



Background

White-bellied Heron (WBH) is a Critically Endangered Species with an estimated population of 50 to 249 mature individuals in Myanmar, Bhutan, India and possibly China. The species requires urgent conservation as the numbers are very low and they exist in habitats severely impacted by anthropogenic activities. WBH is threatened by fishing, collection of insects from river banks, using riverbanks as thoroughfares, collecting fuelwood, stone and sand mining, and recreation. It is also threatened by larger development activities like linear infrastructure and poaching and nest destruction (anecdotal reports).

Solutions

- Prioritising surveys in the vast landscape of Arunachal Pradesh, conducting systematic surveys in new areas and monitoring the status of the species in the known areas.
- Engaging with communities and other stakeholders to find ways to conserve the species and prevent local extinction.

Outcomes

Surveys in new areas of Namdapha Tiger Reserve have identified new sites of distribution of the species. The prioritisation exercise facilitated by the IUCN SSC White-bellied Heron Specialist Group has identified survey areas, which can be used by other partners. We were able to leverage the funds from the National Geographic Society and raise more resources from Oriental Bird Club and Synchronicity Earth UK.

Impact of changing agricultural practices on the food system in Dzongu, Sikkim, India



Background

The Sustainable and Healthy Food Systems (SHEFS) is an overarching research project, where we are carrying out a component titled 'impact of changing agricultural practices on food systems in Dzongu, Sikkim, India'. The major objective of the study is to understand the drivers of change in the agriculture system and their impact on the food system and to provide policy inputs to various sectors of the Government of Sikkim. Dzongu is located in Sikkim's North District and inhabited by the indigenous Lepcha ethnic community. The terrain is approximately 78 sq. km, with an altitude ranging from 700 m to 6000 m. The Lepcha people have always embraced traditional farming practices such as planting local landraces and eating local food, but this has changed significantly.

Solutions

We are working with local stakeholders and community leaders in Dzongu to understand the change in agriculture, the drivers of change and the overall impact on the biodiversity, ecosystem and food cultures.

Outcomes

The study shows agriculture is the primary source of income for the vast majority of the population. One of the key drivers of change in the community's food system has been a growing reliance on government-subsidised food grain and easy access to markets. Agro-biodiversity and traditional knowledge and practices are on the decline. Conservation of traditional knowledge and practices, the revival of local food cultures, linking nutrition and food through improved homestead farming and bringing dietary diversity to school meal programmes are some recommended actions for the local government.

Conserving the Chinese Pangolin *Manis pentadactyla* in socioecological landscapes of Darjeeling Sikkim landscape, Eastern Himalaya, India



Background

The socioecological landscapes outside Protected Areas hold valuable biodiversity. However, they have not been subjected to systematic studies and documentation. Also, species conservation in India is completely focused on Protected Areas. Thus these landscapes are challenged as conservation is not a priority here. Legal instruments of the Wildlife Protection Act of India (1972) are less effective due to the lack of monitoring and regulation in such landscapes that are private, even though Pangolins are under Schedule I of the 1972 Act.

Our work in the socioecological landscapes confirmed the presence of the Critically Endangered Chinese Pangolin *M. pentadactyla* in the tea plantations of Darjeeling. However, the species has inadequate legal protection. Local awareness about Pangolin conservation, the penalties of wildlife trade and the legal instruments binding the trade on the species were very low and the species was exploited and traded.

Solutions

The current project builds into the work we initiated in 2014 to understand their distribution, status and ecology through field surveys and camera traps. We undertook various activities for awareness building and local community ownership of the conservation of the species.

Outcomes

1. Gathered systematic information on the distribution and threats from the Tea Estates of Darjeeling, which are strongholds for the Chinese Pangolins. Surveys in the adjacent forests have shown their preference for the tea landscapes, further supporting the importance of the tea plantations as a refuge for the species.
2. Generated ecological information on burrow use, habitat use and activities of the Chinese Pangolin for the first time from the landscape.
3. Involved and engaged with more than 200 people in raising awareness and sensitisation.

An aerial photograph of a densely forested hillside. Several small, colorful buildings (blue, green, white) are scattered across the slope, some appearing to be part of a community or conservation center. The terrain is steep and covered in lush green trees and vegetation. The sky is overcast and grey.

OUR COMMUNITY CONSERVATION CENTRES (CCCs)

Agasthyamalai (Kalakad-Mundanthurai Tiger Reserve) (KMTR)

Biligiri Rangaswamy Temple Tiger Reserve (BR Hills)

Vembanad Community Environmental Resource centre (CERC)

Male Mahadeshwara Hills (MM Hills)

AGASTHYAMALAI (KALAKAD-MUNDANTHURAI TIGER RESERVE) (KMTR)



Trails of Tamiraparani, a first ever coffee table book on the Porunai landscape.

The authors of *Trails of Tamiraparani*, with a team of contributors from the landscape, have attempted to capture the many aspects of the Porunai landscape through scintillating photographs. The coffee table book format is mainly to catch the attention of the newer generations and kindle their interest to act as stewards to conserve the nature, culture and livelihoods of this very unique landscape and cherish the rich history. The book is published by ATREE, with the generous support of Sundaram Finance and Brakes India Ltd.

About the book

Tamiraparani, the only perennial river in Tamil Nadu, originates in the Pothigai Hills in Tirunelveli District. The book captures the myriad hues of the landscape, its glorious heritage, prosperity and the travails of the past. Meandering its way through the lush green paddy fields of Ambasamudram to the marshy Punnakayal near Thoothukudi, where it meets the sea, Tamiraparani drains out a thousand untold stories.

The book comprises four chapters, Ainthinai, Panpadu, Varalaru and Vazhviyal, as enshrined in the ancient Tamil Sangam literature. Ainthinai (landscapes) captures the five vivid landscapes of Tirunelveli from the mountains to the shores. Panpadu (culture) reminisces the symbols of past glory. Varalaru (history) offers a glimpse into its transition from Tinnevely to Tirunelveli, and Vazhviyal is a colourful narrative of people, culture and livelihoods.

BILIGIRI RANGASWAMY TEMPLE TIGER RESERVE (BR HILLS)



BR Hills Wild Bee Honey Cluster (Major)

The Ministry of Micro, Small and Medium Enterprises has awarded ATREE the SFURTI project (Scheme of Fund for Regeneration of Traditional Industries) to develop honey clusters for the Soliga tribal community in BR Hills, Karnataka. The scheme's objective is to organise the traditional industries and artisans into clusters to make them competitive, provide support for their long-term sustainability and facilitate sustained employment for traditional industry artisans and rural entrepreneurs.

Under this project, ATREE, Keystone and IMEDF are the Implementing Agency, Technical Agency and Nodal Agency, respectively. The Government of Karnataka has allocated half an acre of land for the project. The common facility centre is being built with scientific honey processing machinery. The project is focused to develop and grow honey harvesting and processing. The community members are also provided regular training for sustainable harvesting and are equipped with protection gears for their safety.

The scheme helps them to market their products in new markets. It was estimated to process around 15 to 20 tonnes of honey every year and about 600 Soliga honey harvesters are the beneficiaries. Each batch of honey will have a unique flavour depending on the flowers chosen by the honey bees. The processed honey will be sold under the brand Adavi by the Soliga cooperative society. The income generated goes back to the community as an incentive to conserve and monitor honey bees.



VEMBANAD COMMUNITY ENVIRONMENTAL RESOURCE CENTRE (CERC)

Project: Disaster preparedness grama sabhas as a model for community climate resilience

The impact of climate disasters is universal, but the climate vulnerability experienced by each community is distinctive. Therefore, prompt preparedness considering the topographical and social vulnerabilities is needed to reduce the impacts of disasters.

Post-flood situations in Kerala demand household-level awareness and preparedness to respond to disasters. The quintessential arena for such interventions is gramasabhas, the lowermost unit of the Panchayati Raj.

The Disaster Preparedness Gramasabhas (DPGs) are the institutional governance system set up to create disaster-literate communities

and prepare people to respond fast and cope with disasters.

ATREE-CERC, in association with the District Disaster Management Authority, Alappuzha and Nedumudy grama panchayat's Disaster Preparedness Gramasabhas in all the 15 flood-prone wards, has been working to improve the effectiveness of disaster preparedness and build community capacity to manage disasters in a better manner.

Project: Ashtamudi Fish Count

The first Ashtamudi Fish Count (AFC) was organised by ATREE in association with the Department of Aquatic Biology and Fisheries, University of Kerala and Department of Fisheries, Government of Kerala on March 8 and 9, 2022. It was held in the backdrop of the fishery value of the Ashtamudi Lake that supports the livelihood of hundreds of fisherfolk and the reported decline in fishery resources.

The AFC was planned in two phases: the first phase involved training the volunteers including fisheries students, fisherfolk and citizen scientists. It was planned as a stakeholder-driven programme where the volunteers interacted with the fisherfolk to collect information on the fish diversity, ecosystem changes and threats, and their perceptions on conserving the resources. The second phase

involved the census. The training programme was inaugurated by Dr Arun S. Nair IAS (Sub Collector, Kollam). The fish count was flagged off at Ashramam by Smt J. Mercykutty Amma, Minister for Fisheries, Government of Kerala.

The census recorded 82 species representing 19 orders and 35 families. One important finding of AFC is the decline in species diversity and the increase in marine species, even in the freshwater zone, indicating declining freshwater flow from the Kallada River. The team recorded three species for the first time: the Tripod fish *Tricanthus bicaculeatus* (local name Muppiri), Cardinal fish *Apogonichthys teaniatus* (local name: Kadauva nanthal) and Queenfish *Scomeroides lysan* (Cheru paara).

The exotic species recorded from the lake during the survey include Nile tilapia *Oreochromis niloticus* (Linnaeus, 1758) and

Mozambique tilapia *Oreochromis mossambicus* (Peters, 1852). The rapid invasion of invasive South American Charru mussel *Mytella strigata* (Hanley, 1843) is a matter of grave concern to the lake ecology.

Project: Kayal Sammelanam

The Vembanad Lake Protection Forum and ATREE-CERC jointly conducted 'Kayal

Sammelanam' at Srayithod, Muhamma on October 31, 2021, as part of the annual Ayilyam Makam, a traditional ritual of the fisherfolk (also known as Kayal pooja). Around 100 fisherfolk assembled in the lake with their canoes. Kayal Sammelanam requested the state and union governments to install a special package similar to the Kuttanad package for improving the ecology and sustainable livelihood of the lake-dependent people.



Project: Climate Leadership Program (CLP) 2022

ATREE CERC, in association with SUSTERA Foundation (Thiruvananthapuram), organised the Climate Leadership Programme 2022 from February 9, 2022. It was a two-month-long online intensive leadership training programme for 27 selected leaders of the age group 22 to 35 with representation from every district in Kerala. The main aim was to build leadership capacity for the change makers who could then work in their communities in climate adaptation, support global efforts to limit emissions, and bring about innovations to scale up technological and traditional knowledge-based climate solutions. After the online training, the cohort gathered for the offline session at the Moozhikulam Jaiva Campus, Ernakulam. The programme facilitated the mentoring of climate action initiative ideas of each fellow, leveraging domain experts and peer learning and ensuring that the fellows exit with an actionable project.



Project: Disaster Resilience Leadership Programme (DRLP)

ATREE CERC, in association with Sustera Foundation, KSDMA, KILA and Fortune IAS Academy, designed a unique, interdisciplinary experience for young participants in Disaster Resilience. Disaster Resilience Leadership Programme (DRLP) addressed how young leaders could be absorbed in a disaster response action plan. DRLP commenced on June 25, 2021. Two weeks of extensive training was provided on tools to build resilient communities with the guidance of experts from the state disaster management and local administrative bodies. Fifty participants from across the state attended the programme.

Project: Vembanad-Kol Wetland Mitra Orientation

'Wetland Mitra' is a programme introduced by the Ministry of Environment, Forest and Climate Change to protect the major wetlands of the country through citizen participation. The network aims to be a communication and outreach vehicle for promoting awareness about the value of wetlands and the management and conservation efforts. ATREE CERC is coordinating the Wetland Mitra programme for - Vembanad Kol wetlands in association with the State Wetland Authority, Kerala. The orientation programme for the Wetland Mitras was held at KTDC Hall, Thanneermukkom, February 28, 2022.

MALE MAHADESHWARA HILLS (MM HILLS)

Project: Eco-sensitive tourism in collaboration with the Travel to Learn

The MM Hills team, along with Travel to Learn, has started organising eco-sensitive tourism for domestic and international students of environmental studies, social work, humanities, design, biology, ecology, Ayurveda medicine – mainly urban youth interested in volunteerism, service-learning and seeking unique rural experience. A new initiative, it provides an opportunity to learn about forests, biodiversity, tribal and rural life and livelihoods. We have conducted two such events so far. This is also an opportunity to make ATREE'S conservation centre in MM hills self-reliant, provide jobs and improve the livelihood of the local community, besides promoting rural and responsible tourism among the urban population.

Project: Result-sharing workshop between ATREE and Karnataka Forest Department

A collaborative workshop was held between ATREE and Karnataka Forest Department (KFD) at MCCC in 2021. About 55 KFD staff, including DCF, ACF and Range Officers from MM Hills WLS actively participated along with the ATREE staff (Fellows, Research Associates and Students). The workshop focused on ATREE's research work in MM Hills over the last 20 years and brainstormed about co-management strategies, sustainable use and conservation of forest and forest resources. The DCF (Mr Yedukondalu, IFS) and ACF (Mr Prabhakar Priyadarhini, IFS) also shared management plans, issues, challenges and new initiatives toward inclusive forest conservation. The DCF stressed on the programme conducted over

the last five years in the Kollegal forest division, community participation and the way forward. The ACF emphasised the problem of invasive species in MM Wildlife Sanctuary, focusing on *Senna spectabilis* that has spread in the place lantana, its impacts on biodiversity and the strategies and management plan to mitigate it. Dr Aravind Madhyastha, Dr Madegowda, Dr Harisha, Dr Ravikanth, Dr Priyadarsanan Dharmarajan and Dr Siddappa Setty presented ATREE's long-term research results, outreach and enterprise-based livelihood activities in MM Hills.

Project: Monitoring rock bee colonies and Adavi initiative:

The MM Hills research team has been monitoring rock bee colonies, pre- and post-honey harvest to understand the extent of the

harvest and its impacts on the bee population. For the past seven years, we have been estimating the quantity of honey harvested and the income generated by the harvesters. Adavi processing unit is a registered cooperative established with the membership of 120 harvesters at Anehola village, MM Hills. It has been marketing value-added NTFP products for the past six years. The honey is procured directly from the harvesters. The turnover of the value-added products unit in 2021–22 was 3.2 lakh rupees. More than two lakhs of income generated was shared with 120 members in the annual general body meeting.



Project: Wild food plants and conservation

Result-sharing workshop between ATREE and Karnataka Forest Department. The focus of the study was to understand the dependency, sharing practices and knowledge of 125 wild food plants (WFPs) that have been documented previously in MM Hills Wildlife Sanctuary. We documented the cultural and socio-economic values, health benefits and nutritional values of WFPs. A coffee table book on the seasonal availability of WFPs, dietary practices and indigenous recipes is underway.



Project: Exercising the rights

The DBT-funded project focused on the development of a co-management plan for the sustainable use of forest resources and conservation practices in the MM Hills Sanctuary. More than 35 villages comprising members from the Soliga community, gram panchayat, LAMPS, forest department and SAS were involved in the project. We have submitted a final action plan to the forest department for consideration.



Project: COVID-19 relief efforts (Humanist project)

During the COVID-19 period, the MM Hills team conducted a village-level awareness programme along with the Institute of Public Health and SAS. We distributed three sets of medical kits and 7,000 masks and soaps to the Soliga people in 35 villages. The awareness programme also included street play.

OUR INITIATIVES

Alliance for Reversing Ecosystem Service Threats (AREST)



The project combines scientific rigour and grassroots engagements to achieve climate and human well-being through ecological restoration. AREST supports the implementation of India's NDC and LDN pledges by targeting restoration through conservation, agroforestry and reforestation to enhance rural livelihoods, food security and ecosystem services.

The project focuses on scientific, evidence-based assessments of carbon sequestration and other co-benefits from restoration, such as biodiversity conservation and hydrological security. Through interdisciplinary research, we have identified 12 million hectares of degraded land in peninsular India with the potential for restoration interventions. We have also carried out a detailed Policy and Institutional Mapping exercise to identify relevant stakeholders, financial allocations, unspent public funds and implementing agencies across multiple ministries. We are now identifying synergies and a policy pathway for ecological restoration in India.

Additionally, we are designing pilot programmes to put our findings into practice:

1. In Maharashtra, we have collaborated with Grasslands Trust and ResQ to conserve grasslands (which comprise over 7% of the state's land) for people, biodiversity and carbon sequestration through a public engagement and policy advocacy model. We are developing policy briefs, films and infographics to support the same.
2. We are also supporting an ecological restoration pilot in Chikkaballapur, Karnataka, in collaboration with LibTech and FES. The objective is to recalibrate the NREGA programme with a co-funding model of direct CF-based investment to promote public finance for finding scalable ecological restoration solutions.
3. In Madhya Pradesh, our interventions are based on a carbon finance model.
4. In Raichur, Karnataka, our team has been analysing data and working with the local government to plan a customised ecological restoration plan.

National Mission on Biodiversity and Human Well-Being (NMBHWB)



India's varied ecosystems, across land, rivers and oceans, feed our people, enhance public health security, and shield us from environmental disasters. While the precise economic value of all ecosystem services provided by biodiversity may not be known, estimates suggest our forests alone yield Rs 128 trillion per year.

India's Ministry of Environment, Forest and Climate Change is planning to launch an ambitious National Mission on Biodiversity and Human Well-Being (NMBHWB). This Mission is one of the nine national missions approved by the Prime Minister's Science, Technology and Innovation Advisory Council in 2018.

The Mission will strengthen the science of restoring, conserving, and sustainably utilising India's natural heritage; embed biodiversity as a key consideration in all developmental planning, particularly in agriculture, ecosystem services, health, bio-economy and climate change mitigation; and establish a citizen and policy-oriented biodiversity information system. The ongoing spread of COVID-19 places this Mission among the most significant national initiatives. This crisis has exposed the dysfunctional relationship between humanity and nature, and we must urgently address the issues it has laid bare, the Mission offers a comprehensive framework, integrated approaches, and widespread societal participation.



KHOSHOO AWARDEE

Tanya Seshadri

Tribal Health Resource Centre
Vivekananda Girijana Kalyana Kendra



TN KHOSHOO AWARD

Dr. N. S. Prashanth

Assistant Director (Research),
Institute of Public Health, Bangalore



TN KHOSHOO MEMORIAL AWARD 2021

The award is instituted by ATREE in the name of the late environmental science pioneer and former trustee Dr Triloki Nath Khoshoo to recognise individuals with marked contributions in the field of ecology and the environment. Dr Darshan Shankar, a trustee of ATREE and managing trustee of the Transdisciplinary University, presented the award to Dr Tanya Seshadri and Dr N. S. Prashanth.

Dr Tanya Seshadri was instrumental in setting up the Tribal Health Resource Centre at Vivekananda Girijana Kalyana Kendra (VGKK) and is involved in overseeing the hospital and community health programme catering to the Soliga and other Adivasi communities in Chamarajnar district. Dr N. S. Prashanth is a public health researcher with experience in primary healthcare and community settings in Karnataka. He leads the health equity cluster at the Institute of Public Health, Bengaluru, where his work critically examines the transformative dimensions of technological solutions to health inequities vis-a-vis addressing fundamental issues of social inequality, exclusion and governance.

The theme for this year's award ceremony was 'One Health'. The COVID-19 pandemic has highlighted that encroachment of natural landscapes leads to environmental concerns, but public health is also intricately entangled with it. The One Health approach integrates human health with animal and ecosystem health.

The Memorial Lecture was delivered by Dr Jonathan Epstein, Vice President for Science and Outreach at EcoHealth Alliance. In his lecture, he said, 'It is important to work within our communities, with individuals on the front lines having the strongest connection to nature. They are in the best position to prevent pandemics.'

FINANCIAL STATEMENT

BALANCE SHEET AS ON 31ST MARCH 2022			(INR in Lacs)	
Particulars	31st March 2022		31st March 2021	
<u>Source of Funds</u>				
Corpus Fund		7,406		5,613
General Fund		128		96
Utilised Reserves				
Project Assets		1,497		1,438
Other Assets		31		35
Land and Building		882		893
Project Fund		2,112		1,710
Total		12,055		9,785
<u>Application of Funds</u>				
Fixed Assets				
Project Assets		1,497		1,438
Other Assets		31		35
Land and Buildings		882		893
Investments				
Corpus Investments		7,323		5,594
Other Investments		69		70
Current Assets and liabilities				
Advances	46		59	
Other Current Assets	64		67	
Cash and Bank	2,145		1630	
Gross Current Assets	2,255		1756	
Less: Other current Liabilities	3		1	
Net Current Assets		2252		1,755
Total		12055		9,785

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH 2022		(INR in Lacs)	
Particulars	31st March 2022	31st March 2021	
<u>Income</u>			
Grants	2,020	2,099	
Interest	308	332	
Donation & other income	2	-	
Total	2,331	2,431	
<u>Expenditure</u>			
Centre for Environment and Development			
Forests & Governance	71	62	
Water, Land & Society	277	233	
Climate Change Mitigation & Development	120	91	
Suri Sehgal Centre for Biodiversity and Conservation			
Ecosystem Services and Human Wellbeing	302	301	
Biodiversity Monitoring & Conservation Planning	358	639	
Landscapes, Livelihoods & Conservation	304	262	
Centre for Social and Environmental Innovation	97	130	
Centre for Policy Design	34	15	
Academy for Conservation Science and Sustainability Studies	91	108	
Salaries-Programme Support	101	67	
Administration and Support Expenses			
Salaries/Consultancy-Institutional Support	399	383	
Staff Welfare	60	46	
Administrative Expenses	115	83	
Depreciation	22	25	
Total	2,351	2,445	
Surplus/(Deficit) during the year	(20)	(14)	

RECEIPTS & PAYMENTS ACCOUNT FOR THE YEAR ENDED 31ST MARCH 2022		(INR in Lacs)	
Particulars	31st March 2022	31st March 2021	
<u>RECEIPTS</u>			
<u>Opening Balances</u>			
(Cash & Cash equivalents)	7,293	6,637	
<u>Receipts during the year</u>			
Project Grants	2,478	2,448	
Corpus/Endowments	1,747	110	
Interest	541	447	
Donation and other income	10	32	
Total	12,070	9,674	
<u>PAYMENTS</u>			
Fixed Assets	65	48	
Centre for Environment and Development			
Forests & Governance	82	67	
Water, Land & Society	307	230	
Climate Change Mitigation & Development	121	106	
Suri Sehgal Centre for Biodiversity and Conservation			
Ecosystem Services and Human Wellbeing	295	295	
Biodiversity Monitoring & Conservation Planning	422	589	
Landscapes, Livelihoods & Conservation	312	265	
Centre for Social and Environmental Innovation	97	130	
Centre for Policy Design	34	15	
Academy for Conservation Science and Sustainability Studies	91	108	
Salaries-Programme Support	101	67	
Salaries/Consultancy-Institutional Support	400	383	
Staff Welfare	60	46	
Administrative Expenses	115	78	
<u>Closing Balances</u>			
(Cash & Cash equivalents)	9,568	7,247	
Total	12,070	9,674	

PUBLICATIONS



48
Journal Articles



9
Book Chapters



180
Press/News



26
Popular Articles



99
Conferences/
Talks



2
Reports

THANK YOU FOR THE SUPPORT

I express my sincere gratitude to our principal donor Rohini Nilekani Philanthropies, and all the donor organisations for their generous support. Their support enables us to progress and create impactful work in our thematic areas. We thank our Board of Trustees for guiding ATREE towards the next dynamic phase of development and growth.

Thank you to the team at ATREE for making us a global environmental and sustainability leader.

Vamsidhar Pothula, Chief Operating Officer & Registrar