



Report **BE ALIVE**

Biodiversity, Environment And Livelihoods

ATREE's Agasthyamalai Community Conservation Centre

REPORT PRESENTED TO BRAKES INDIA, SUNDARAM FINANCE AND SUNDARAM HOME

APRIL 2019 - MARCH 2026

EXECUTIVE SUMMARY

Over the past seven years, with support from Brakes India, Sundaram Finance, and Sundaram Home Finance, long-term ecological monitoring across the connected landscapes of the Agasthyamalai landscape has generated critical scientific evidence to understand environmental change and inform conservation action across southern Tamil Nadu. Spanning forests, rivers, wetlands, grasslands, and shared landscapes, these insights inform climate resilient restoration, freshwater conservation, wildlife friendly management, and adaptive landscape planning.

Community-led restoration models have strengthened biodiversity, ecosystem services, and local livelihoods, while citizen science and conservation learning initiatives have engaged thousands of students, teachers, volunteers, and communities in sustaining resilient terrestrial landscapes and freshwater ecosystems. These efforts have strengthened partnerships among communities, government agencies, academic institutions, and civil society organisations, demonstrating how long-term knowledge can be translated into meaningful conservation outcomes across scales and time.

The continued support of Brakes India, Sundaram Finance, and Sundaram Home Finance has been pivotal in sustaining these efforts, engaging more deeply with the landscapes and their communities, exploring new frontiers of knowledge and addressing contemporary conservation challenges. This catalytic support also enabled us to attract funding from the government and private foundations to support additional work in the state and in the landscape. These partnerships demonstrate how sustained investments in knowledge generation, stewardship, and restoration can build resilient futures for both people and nature.

Looking ahead, the next decade offers an opportunity to establish a regional social ecological monitoring, restoration, and learning platform across the Agasthyamalai and Tamiraparani landscapes. By integrating long term science, remote sensing, stakeholder consultations, and community stewardship, it will provide early signals of environmental change and translate knowledge into adaptive conservation action. Immediate priorities include an evidence based Environmental Manifesto for Tamil Nadu, climate resilient restoration of vulnerable ecosystems, social ecological stewardship, and inclusive education and capacity building to build resilient landscapes and communities across southern Tamil Nadu.





Tricalysia apiocarpa: supra annual
flowering species

Why long-term monitoring matters

Climate change, biodiversity loss, and rapid land use change are reshaping ecosystems across the tropics. Yet ecological change is often subtle and unfolds over decades rather than years. Human activities can gradually transform rivers, wetlands, and shared landscapes in ways that may only become visible through sustained observation over time. Understanding these changes requires more than short term studies. It requires persistence that reveals not only what is changing, but also why it is changing and what can be done to build resilient futures.

For more than three decades, the Agasthyamalai Community Conservation Center (ACCC) has served as a living observatory across the connected landscapes of the Agasthyamalai hills and the Tamiraparani basin in South Tamil Nadu. Its long-term monitoring programme recognises that ecosystems do not exist in isolation. Conserving resilient landscapes therefore requires understanding how climate, biodiversity, and people interact across space and over time.

From tropical rainforests and native grasslands to sacred landscapes, rivers, and irrigation wetlands, ACCC generates required scientific evidence and integrates with community knowledge to understand ecological change, identify emerging conservation challenges, and translate science into adaptive management and restoration.

ACCC's long-term monitoring programme is organised across three connected ecological systems.

***Climate Resilient Forests* that provide critical ecological baselines for understanding how tropical ecosystems respond to climate variability and inform science based restoration.**

***Shared Landscapes* that demonstrate how culturally significant spaces, grasslands, and human dominated ecosystems sustain biodiversity beyond protected areas.**

***Riverscapes and associated Wetlands* that reveal how freshwater ecosystems support biodiversity, livelihoods, and water security across the Tamiraparani basin.**

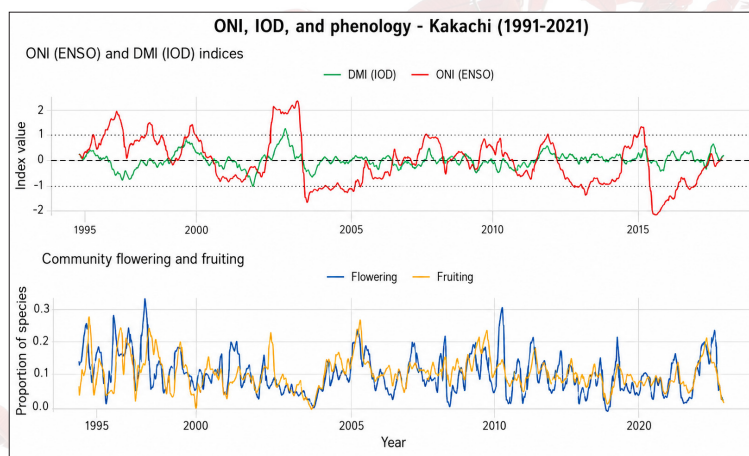
Together, these connected landscapes form a living observatory that generates the evidence needed to answer four fundamental conservation questions:

- How are ecosystems responding to climate and environmental change?
- Which species, habitats, and ecological processes are most vulnerable?
- Where should conservation and restoration efforts be prioritised?
- How can science inform adaptive and socially inclusive conservation action?

The answers emerge not from isolated projects or single observations, but from decades of sustained ecological monitoring partnerships and collaborations across landscapes. By integrating science, stewardship, and conservation action, ACCC demonstrates how long term ecological observations can inform resilient futures for both people and nature.

Forests that remember climate

Long term monitoring has revealed that tropical forests are increasingly sensitive to climate variability, with gradual declines in community level flowering and fruiting, increasing tree mortality, and heightened vulnerability among understorey species. Rainfall, temperature, and solar radiation are important drivers of these ecological responses, while large scale climatic phenomena such as El Niño indirectly influence forest dynamics through changes in local weather patterns. The long term decline in pollinators such as bees and flowering is a matter of concern to the ecosystem functioning and human well being.



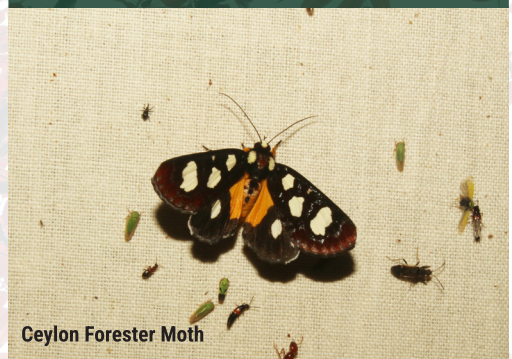
Strong El Niño affects flowering and fruiting

The work has demonstrated the disproportionate role of large, mature trees in maintaining forest carbon stocks and the increasing mortality of these trees highlight the close relationship between climate and forest. Long-term monitoring of over 1,000 moth species, including the rediscovery of Ceylon Forester Moth *Mimeusemia ceylonica* after 127 years, further demonstrates the value of insects as sensitive indicators of ecological change.

Establishing relatively intact forests as critical ecological reference systems for understanding climate change impacts and informing restoration strategies for degraded landscapes.

Informing science-based restoration frameworks currently guiding the ecological restoration of abandoned tea estates in the Agasthyamalai landscape and strengthening climate resilient restoration efforts across the Western Ghats.

Strengthening long-term ecological monitoring partnerships with the Forest Department and advancing biodiversity monitoring innovation, including AI-enabled moth identification tools.



Ceylon Forester Moth



Landscapes that sustain coexistence

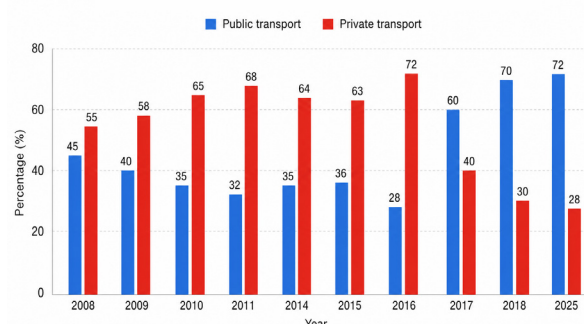
Shared landscapes demonstrate that resilient ecosystems are sustained through coexistence between people and nature. By integrating science, culture, and stewardship across sacred spaces, native grasslands, and culturally significant landscapes, ACCC has informed wildlife friendly management practices, habitat restoration efforts, and culturally sensitive conservation approaches that strengthen biodiversity conservation beyond protected areas.

Faith, festivals and biodiversity

Seventeen years of long-term monitoring have demonstrated that temple tourism can significantly influence wildlife and habitats within protected areas. Monitoring has documented increased wildlife roadkills, habitat disturbances associated with camping activities, and identified roadkill hotspots during festival periods.

Importantly, science based management interventions have led to positive behavioural changes, including reduced private vehicle use and increased adoption of public transport, demonstrating that cultural traditions and biodiversity conservation can coexist through adaptive management.

Use of public transport by pilgrims has increased after our intervention



Informed wildlife friendly management practices for temple tourism in Tiger Reserves through science-based traffic regulation and habitat management interventions.

Contributed through management guidelines for Tiger Conservation Areas, submitted to the National Tiger Conservation Authority, in partnership with WWF India and WWF UK.

Demonstrated a scalable, culturally sensitive conservation model that balances pilgrimage and biodiversity conservation through partnerships among the Forest Department, temple authorities, and local communities, and has been adopted in Ranthambhore and Corbett Tiger Reserves.

Sacred spaces as biodiversity refuges

Twelve years of long-term monitoring have revealed the irreplaceable role of ancient temples as biodiversity refuges in human dominated landscapes, supporting seven bat species along the Tamiraparani River. Population declines associated with temple renovations, bat-proofing measures, and disturbances highlight emerging conservation challenges. Attempts to provide alternative roosting habitats through bat houses have met with limited success, demonstrating that the unique ecological conditions provided by sacred spaces cannot easily be replicated and emphasising the need to explore alternative, culturally sensitive approaches for conserving bat populations.

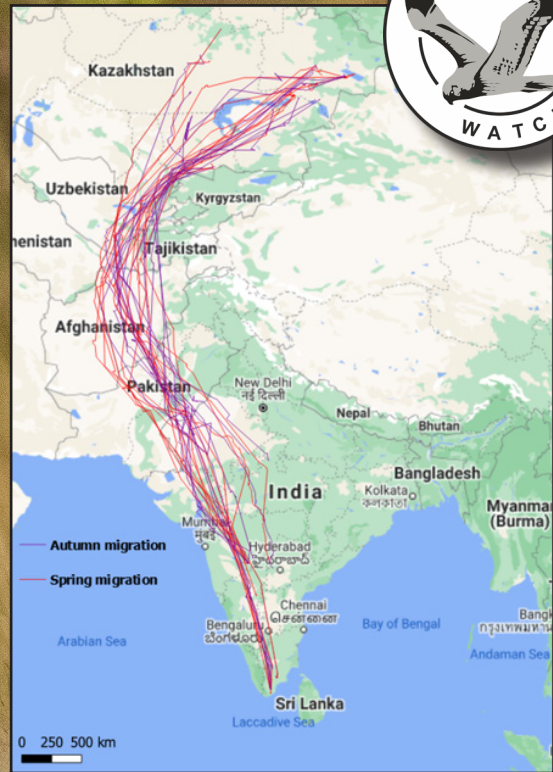
Establishing ancient temples as critical biodiversity habitats requiring culturally sensitive conservation approaches.

Providing alternative to ancient temples is not always successful across a heterogeneous landscape. Temples are critically important for bats to remain and provide ecosystem services to farmers

Demonstrating how safeguarding cultural heritage can simultaneously strengthen biodiversity conservation across shared landscapes



Conserving Grasslands to sustaining harrier migrations



Ten years of long-term monitoring have established native grasslands and grazing commons as ecologically important habitats supporting migratory harriers, native biodiversity, and pastoral livelihoods. Citizen science surveys and satellite tracking have documented three migratory harrier species, namely the Pallid Harrier, Montagu's Harrier, and Western Marsh Harrier, while revealing declining population trends associated with habitat loss and degradation. Dietary analyses have also uncovered an unexpected ecological role of harriers as seed dispersers, highlighting their contribution to grassland resilience and ecosystem functioning. Together, these findings reinforce the importance of conserving native grasslands as dynamic social ecological systems rather than underutilised landscapes.

Providing scientific evidence supporting the conservation and restoration of native grasslands and grazing commons across southern Tamil Nadu.

Contributed to the allocation of 52 hectares of government land for native grassland restoration in Nanguneri Taluk.

Identified priority habitats supporting migratory species, native biodiversity, and pastoral livelihoods to inform landscape level conservation planning.

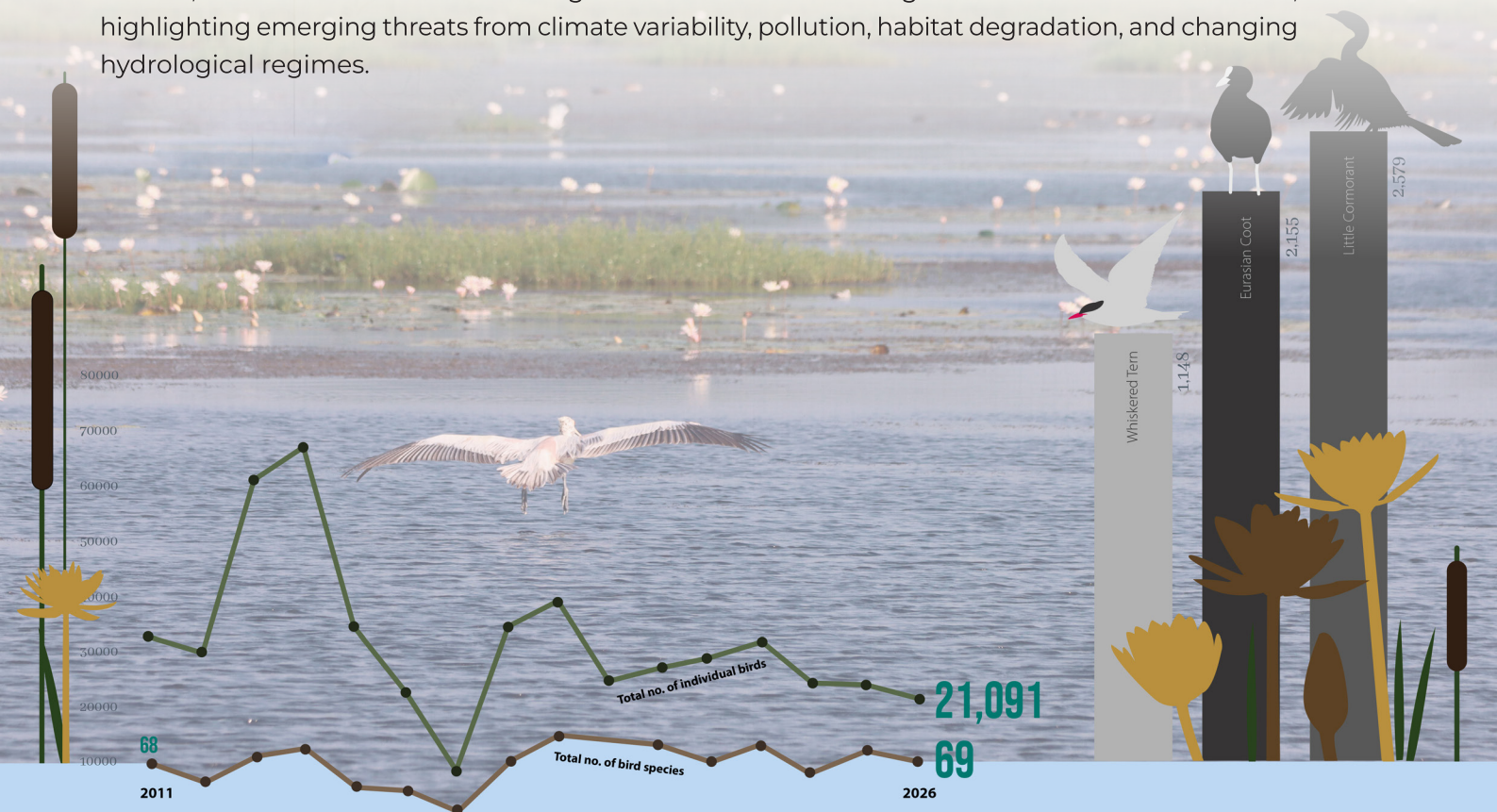
Strengthening citizen science initiatives that promote public stewardship of native grassland ecosystems and migratory birds.

Freshwater landscapes: River wetlands and communities

Rivers and wetlands connect mountains to the sea, carrying water, nutrients, species, and stories across landscapes. The Tamiraparani basin sustains freshwater biodiversity, migratory birds, wetlands, and communities whose livelihoods depend upon healthy ecosystems. Long-term monitoring across rivers and associated wetlands provides critical insights into how freshwater systems respond to environmental change and informs efforts to conserve and restore them. By integrating ecological research, citizen science, and adaptive conservation approaches, ACCC generates the scientific evidence needed to strengthen freshwater resilience across connected river and wetland ecosystems.

WATERBIRDS: SENTINELS OF WETLAND HEALTH

Fifteen years of long-term monitoring have established the Tamiraparani basin as an important freshwater landscape supporting migratory and resident waterbirds along the Central Asian Flyway. With support from Sundaram Finance and Brakes India, monitoring expanded from 48 to 68 wetlands across the basin, strengthening long term ecological observations of freshwater ecosystems. Citizen science-based surveys have documented over 67,000 waterbirds representing up to 75 species, including previously unknown breeding colonies of Spot billed Pelicans, Oriental Darters, and herons. Recent monitoring has also revealed declining bird numbers across wetlands, highlighting emerging threats from climate variability, pollution, habitat degradation, and changing hydrological regimes.



Generating long term scientific evidence informing wetland conservation and adaptive management across the Tamiraparani basin.

Contributing to wetland management plans and Ramsar site conservation initiatives in partnership with the Tamil Nadu State Wetland Authority.

Strengthening citizen science-based freshwater monitoring by engaging over 250 volunteers annually in biodiversity stewardship and conservation action.

FRESHWATER FISH: REVEALING THE HIDDEN DIVERSITY OF RIVERS

Initiated in 2024, the Tamiraparani Fish Count has established the first citizen science-based baseline for monitoring freshwater fish diversity in the river. Surveys have documented 31 native fish species belonging to 14 families, including the rediscovery of the endangered endemic Tamiraparani Carp (*Hypselobarbus tamiraparaniei*) at Kallidaikurichi in 2026. The programme has identified relatively intact river reaches, such as Nadhiyunni, that remain free from major pollution and invasive species, while revealing emerging threats to freshwater biodiversity from habitat disturbance, fishing pressure, and environmental change.

Establishing critical baseline data to inform freshwater biodiversity conservation and adaptive river management across the Tamiraparani basin.

Generating scientific evidence to identify priority river reaches for conservation, invasive species management, and future river restoration initiatives.

Demonstrating the value of citizen science in strengthening freshwater stewardship and conserving native fish diversity across connected river ecosystems.



OTTERS: AMBASSADORS OF RIVER CONSERVATION

The first systematic surveys of otters outside protected areas in the Tamiraparani basin have documented breeding populations of Eurasian Otters across relatively intact river reaches from Papanasam to Marudur, highlighting their value as indicators of river health. The programme has combined ecological monitoring with citizen science and public engagement to strengthen awareness of freshwater biodiversity and the ecological importance of connected river ecosystems. Together, these findings demonstrate that conserving relatively undisturbed river reaches is critical for sustaining freshwater biodiversity beyond protected areas.

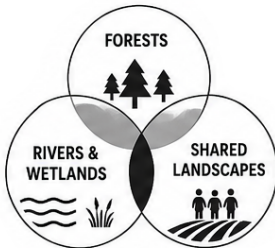


Generating the first scientific baseline for otter conservation outside protected areas in the Tamiraparani basin.

Providing scientific evidence informing proposals for Otter Conservation Reserves and Biodiversity Heritage Sites across priority river reaches.

Strengthening freshwater stewardship by positioning otters as flagship species for river conservation through citizen science and public engagement initiatives.

Impacts at a glance



A landscape scale observatory spanning forests, shared landscapes, rivers, and associated wetlands across the Agasthyamalai and Tamiraparani landscapes. Three connected ecological systems are monitored to understand how climate, biodiversity, and people shape resilient landscapes.



**30⁺
YEARS**

Permanent vegetation monitoring and long term pollinator observations informing climate resilient forest conservation and restoration.



**17
YEARS**

Monitoring the biodiversity impacts of temple tourism in Tiger Reserves and informing wildlife friendly management practices.



**15
YEARS**

Citizen science based waterbird monitoring across the Tamiraparani basin informing wetland conservation and management.



**12
YEARS**

Bat monitoring demonstrating the importance of ancient temples as biodiversity refuges in human dominated landscapes.



**10
YEARS**

Monitoring migratory harriers and native grasslands to strengthen the conservation of grazing commons and shared landscapes.

From knowledge to collective action

Building stewardship and partnerships for conservation

Conservation is sustained not only through scientific discoveries, but also through the people and institutions that translate knowledge into action. Across connected landscapes, ACCC bridges ecological research, public governance, and citizen participation to strengthen long term stewardship of biodiversity and freshwater ecosystems.

Through citizen science, ACCC transforms communities into active participants in biodiversity monitoring and conservation, generating valuable ecological datasets while nurturing communities committed to freshwater, forest, and insect conservation. Experiential learning programmes including heritage trails, field schools, and environmental education initiatives strengthen environmental literacy and foster stewardship across generations and communities.



Impacts at a Glance

Building resilient landscapes also requires strong institutions and collaborative governance. By working closely with government agencies, district administrations, academic institutions, and civil society organisations, ACCC strengthens capacities for biodiversity monitoring, adaptive management, and evidence based environmental governance across southern Tamil Nadu. Together, these initiatives demonstrate that resilient futures are built not only through scientific knowledge, but through collective action that connects people, institutions, and nature.



More than 50,000 people engaged through conservation outreach and capacity building initiatives.

Over 5,000 participants engaged through the Tamiraparani Waterbird Carnival and associated citizen science programmes.

More than 2,000 participants and a network of 400 citizen scientists contributing to moth biodiversity monitoring across southern India.

Over 1,200 water bodies mapped through the Nellai Neervalam initiative.

Twenty Eco Heritage Trails engaging more than 800 participants across rivers, wetlands, grasslands, and cultural landscapes.

Twenty five frontline Forest Department staff trained in long term biodiversity monitoring and conservation planning.

Partnerships with district administrations supporting biodiversity governance across village panchayats in southern Tamil Nadu.

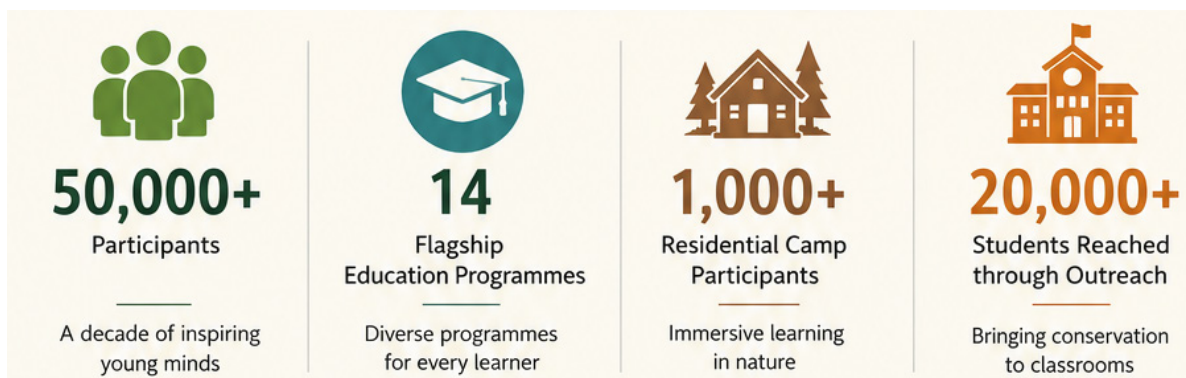


Inspiring lifelong stewardship towards nature



Lasting conservation begins when people experience, understand, and care for nature. Since 2017, ACCC has nurtured lifelong stewardship by reconnecting children, teachers, and communities with the natural heritage of southern Tamil Nadu through experiential learning, citizen science, creativity, and leadership development across connected landscapes.

Learning begins in nature. Through Camp wiLD, Wetland ROVERS of Tamiraparani, and wiLD Tamiraparani Walk, children explore forests, rivers, wetlands, grasslands, and coastal ecosystems while developing ecological literacy and meaningful relationships with the natural world. These experiences extend into schools through My wiLD Schoolyard, Museum wiLD, Bug'splorer, and Green Brigades, transforming classrooms into living laboratories where students discover biodiversity through observation, inquiry, and habitat restoration.



Conservation grows when communities participate. Initiatives such as Live and Let's Live, Birdman's Walk, Family wiLD Quest, and wet 'N' wiLD promote inclusive and culturally relevant conservation learning, while Conservation Connect, Climate Smart School, and Virtual wiLD equip teachers and students to become future conservation leaders through climate education, citizen science, and long term environmental monitoring.

Together, these programmes are nurturing environmentally conscious citizens who are contributing to conservation within their schools, communities, and landscapes.

Impacts at a glance

Fourteen flagship conservation education programmes implemented across connected landscapes.

Over 50,000 students, teachers, parents, and community members have engaged since 2017.

Over 20,000 students and community members reached through biodiversity outreach initiatives.

1,000+ participants engaged through residential nature camps.

600+ children with disabilities connected with nature through inclusive learning programmes.

40+ teachers trained as conservation leaders.

Thousands of school children connected with forests, rivers, wetlands, grasslands, and coastal ecosystems through experiential learning.

Ecological restoration: developing scalable models for conservation

Over the past seven years, ACCC has developed and demonstrated science-based, community-led models of ecological restoration across wetlands, grasslands, and sacred temple landscapes (Nandavanams) in the Tamiraparani River basin. By integrating ecological research with community stewardship, local governance, and livelihood needs, these initiatives restore degraded ecosystems while generating scalable approaches for enhancing biodiversity, ecosystem services, and climate resilience across the landscape.

Wetland restoration: reviving water, biodiversity, and livelihoods

ACCC restored three irrigation wetlands in partnership with local communities and the Tirunelveli District Administration through invasive species removal, desilting, habitat enhancement, and water infrastructure restoration. A science-based management plan was developed for Kazhuvur Wetland, demonstrating how wetland restoration can simultaneously enhance biodiversity, water security, and local livelihoods. This has subsequently led to the development of a Wetland Index and the prioritisation of six wetlands for restoration through additional funding



Grassland restoration: building models for semi-arid landscape recovery



ACCC established a 52 ha socio-ecological grassland restoration experiment, among the first of its kind in Tamil Nadu, to identify effective restoration strategies for semi-arid grazing landscapes. The programme demonstrated that minimal disturbance to the soil led to more grass species, while tilling led to growth of herbs. Invasive species removal followed by natural regeneration and the establishment of woody hedges is the most effective and economically viable approach. Subsequently, this has expanded through community-led restoration efforts across the landscape.

Namma ooru nandavanam: restoring sacred landscapes

The Namma Ooru Nandavanam initiative has restored or established ten temple Nandavanams across Tirunelveli district, transforming degraded temple lands into native biodiversity gardens. Documenting 545 native trees representing 78 species and achieving over 90 per cent tree survival at several sites, the initiative highlights the role of community stewardship in sustaining culturally rooted ecological restoration.



Impacts at a glance



3

Irrigation wetlands restored and a management plan developed for the ecologically important Kazhuvur Wetland.



52 ha

Socio ecological grassland restoration experiment established, generating scalable models for restoring semi arid grazing landscapes.



10

Temple Nandavanams restored or established, documenting 545 native trees belonging to 78 species.

Approximately 500 farmers and 7,000 livestock across 11 villages benefit from improved ecosystem services and restored grazing resources.

- Demonstrated science based, community led restoration models that integrate biodiversity conservation, livelihoods, and climate resilience across the Tamiraparani landscape.

Way Forward

Scale restoration models across forest, riverine, and human dominated landscapes to strengthen biodiversity and climate resilience.

Advance climate literacy, place based nature education, and long term social ecological monitoring to generate early signals of environmental change and inform adaptive conservation action.

Undertake regional assessments and stakeholder consultations to guide conservation priorities, evaluate interventions, and adaptively expand monitoring, restoration, and community stewardship across the landscape.

Strategic Priorities

POLICY AND LANDSCAPE ASSESSMENTS

Landscape assessments to evaluate ecosystem recovery, identify conservation gaps, and inform environmental policy in Tamil Nadu.

Co develop an environmental manifesto for Tamil Nadu with government, academic, and civil society partners.

Establish an integrated freshwater biodiversity observatory for the Tamiraparni basin by combining environmental DNA, conventional biodiversity surveys and remote sensing to generate the first basin-scale assessment of freshwater biodiversity and ecological integrity.

RESTORATION AND CLIMATE RESILIENCE

Scale restoration models across southern Tamil Nadu.

Advance river restoration in the Pachaiyar and Nambiyar river basins

Propose a Conservation Reserve for otters to enable the restoration of otter habitats and freshwater corridors while allowing low-impact community use.

Strengthen grassland restoration through community based native grass seed nurseries and restore canopy connectivity across fragmented tea landscapes in KMTR, enabling canopy fauna, important seed dispersers, to catalyse landscape scale ecological restoration.

STEWARDSHIP AND LIVELIHOODS

Strengthen participatory social ecological monitoring across landscapes.

Assess the ecological and cultural benefits of restored temple Nandavanams.

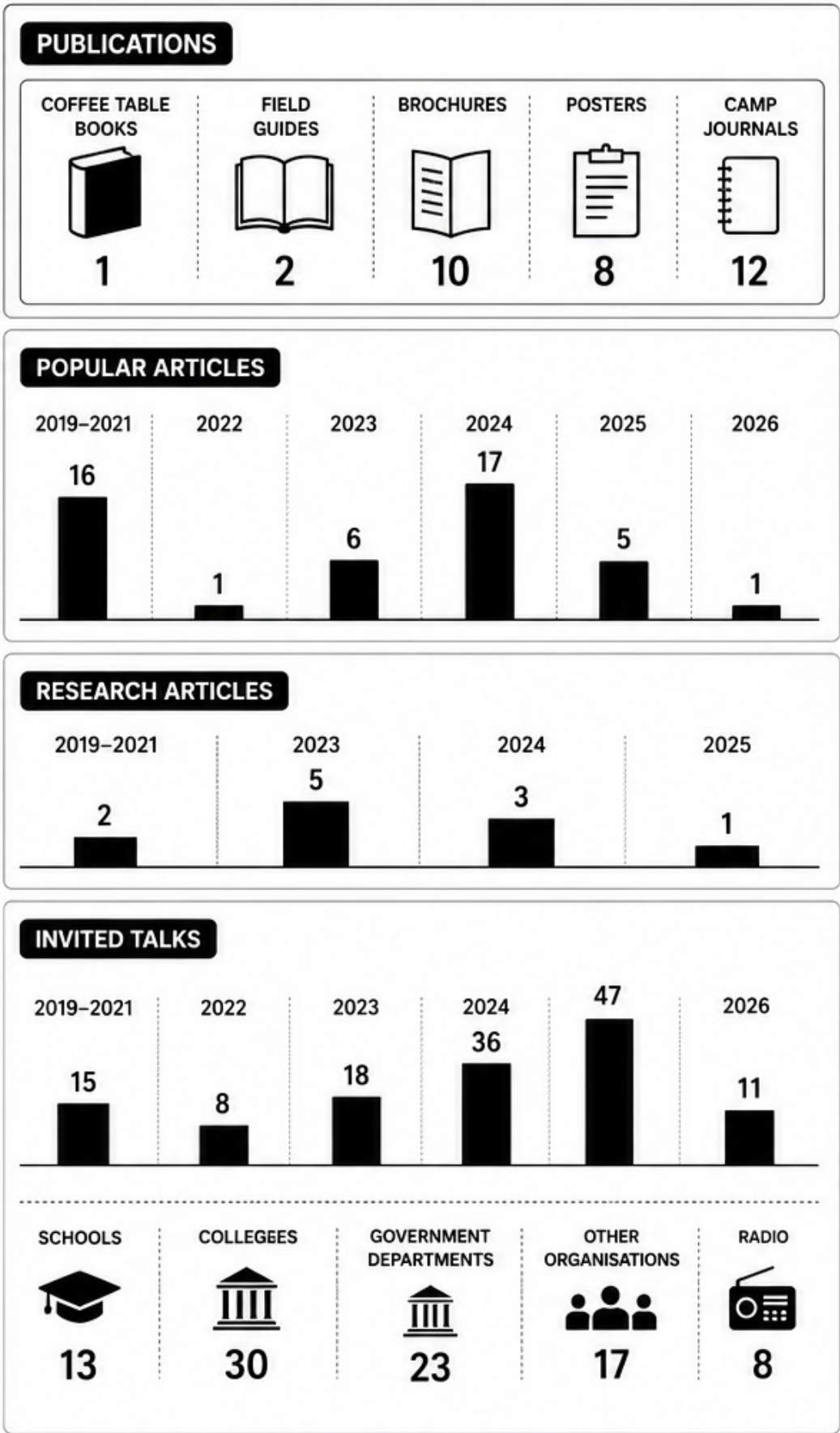
Expand nature based livelihoods and ecotourism for women and youth.

EDUCATION AND CAPACITY BUILDING

Scale the inclusive nature education models across Tamil Nadu, with special emphasis on children with disabilities.

Support one PhD and two MSc fellowships addressing priority social ecological challenges for students from within the landscape

Outputs



NEWS COVERAGE / PUBLISHERS

EN

Scroll.in
The Federal
Mongabay India
Current Conservation
Frontline-The Hindu
Down To Earth
Sanctuary Asia
New Indian Express
The Wire
The Hindu
Times of India
ETV Bharat English

தமிழ்

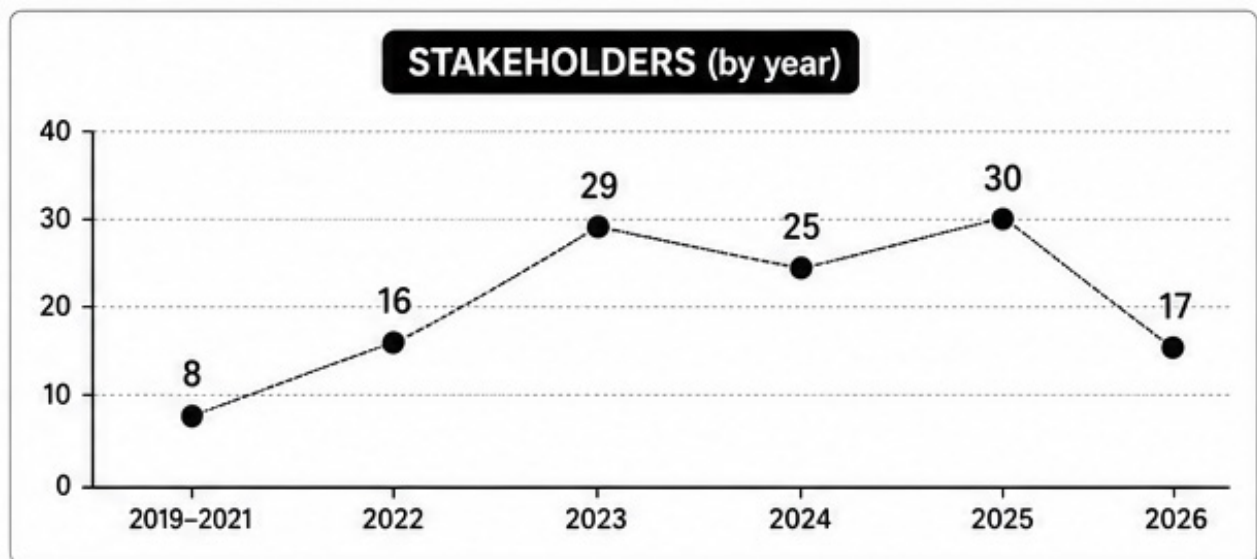
Vikatan
BBC News Tamil
Hindu Tamil
Kungumam
Dhina malar
Pasumai Vikatan
Dina karan
News 18 Tamil
Puthiya thalaimurai
ETV Bharat Tamil

JOURNALS

Oikos, Journal of Threatened Taxa, Ardea, Nature, Current Science, NELUMBO, PLOS ONE, Species, Springer Nature Link, PECON, ACTA ORNITHOLOGICA, Wetlands Ecology and Management, Movement ecology, Biotropica, Journal of arid environment, International Journal of Remote Sensing

AWARDS & RECOGNITION

Green champion, Community conservation leadership award.



TEAM



Dr. T. Ganesh



Dr. R. Ganesan



Dr. M. Soubadra Devy



Dr. K. S. Seshadri



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P. Maria Antony



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Suba mary



Pirammu



Thiravium



Arunachalam



Paramasivan



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