



# ANNUAL REPORT 2015-16



Ashoka Trust for Research in  
Ecology and the Environment

**ASHOKA TRUST FOR RESEARCH IN ECOLOGY AND THE ENVIRONMENT**

# ANNUAL REPORT

## 2015-16

Coverpage Image:

**Fishermen in Vembanad,  
Kerala continue to practice  
sustainable fishing.**

*©Shaji Cherthala*



**ASHOKA TRUST FOR RESEARCH IN ECOLOGY AND THE ENVIRONMENT**



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1. Critically Endangered Sociable Lapwing Spotted in Kutch, Gujarat. © Ovee Thorat  
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3. Parakeets: Blossom headed parakeets spotted at Papikonda National Park, Andhra Pradesh. © Vikram Aditya



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## President's Message

ATREE completed its 20<sup>th</sup> year of operations this year. To celebrate this significant anniversary, a series of events has been planned for the next few months. These include symposia, conferences and workshops on water, biodiversity, and climate change, with development, governance, and policies as cross-cutting themes.

Twenty years may not seem like a long time. However, we are very proud of what we have achieved in this time, we have transformed the nature of environmental research in India by integrating concepts and principles of the natural and social sciences, while addressing needs and concerns of local stakeholders. We have tried to keep in mind key national or global imperatives, in order to link knowledge generation directly with policy and governance. We have developed a number of innovative tools and approaches for environmental research, and have successfully engaged the civil society in environmental discourse through imaginative outreach programmes.

Equally important, ATREE has paid special attention to preparing the next generation of environmental leaders through its novel, interdisciplinary doctoral programme with a focus on

conservation and sustainability studies. The programme currently enrolls more than 50 doctoral students—many among whom are women students and students from Northeast India. As is evident from the publications listed in this report, ATREE students are breaking new ground.

Indeed, ATREE continues to be recognised for its work. ATREE has consistently maintained its ranking as a leading environmental think-tank in Asia, and is each year ranked among the top 20 in the world. ATREE's faculty and students continue to win many awards as noted in this report.

As our environmental challenges continue to mount, institutions like ATREE will become more and more relevant. They will have a special role to play in meeting growing challenges, and must enlarge both the scope of their activities and the regions they cover. Indian institutions must also play a greater role in shaping regional and global discourses on humanity's relationship with nature and addressing issues of equity in the use of natural resources in India and beyond.

New challenges will demand greater creativity, more programmatic innovation, and wider impact. ATREE should be prepared to be creative, innovative and impactful. One measure of the impact is the increase in number and diversity of outputs described in the next few pages.

We thank our donors who have been responsible for our remarkable success. In this particular year, we are particularly grateful to Rohini Nilekani, the Shibulal family, Tata Trusts, the Royal Norwegian Embassy and International Development Research Center (IDRC) for their generous support. Many others are acknowledged at the end of this report.

**Kamaljit S. Bawa**  
President, ATREE



## Director's Desk

Though I joined as Director only in February, 2016, I feel like I have been part of the organisation in some way or the other over the years. Having been associated with ATREE before as Fellow, Associate Director, Adjunct Fellow, and friend/collaborator, it is hard to keep a dispassionate distance.

Today, ATREE has multiple identities, which allows it to occupy a somewhat unique space. First, it is an applied research institution that generates inter-disciplinary knowledge to address issues related to environmental conservation and sustainable development. It is a think tank that addresses policy relevant issues to influence change in society. And it is an academic institution, with a faculty of over 20 Fellows and a PhD programme with over 40 students, working on a range of diverse topics in the social and natural sciences. With graduate level course work cutting across these disciplines, the PhD programme should rank as one of the finest in the global South. Finally, ATREE engages with communities for on-ground action. Each of these contributes a critical dimension to the organisation, enabling it to meet current environmental and social challenges.

ATREE's programmes focus on biodiversity and ecosystem services, water and landscapes, and cut across sectors including conservation, governance, livelihoods and energy. With a new programme in Climate Change Mitigation and Development, and interdisciplinary initiatives in the water and health sectors, ATREE is addressing critical contemporary challenges by carrying out cutting-edge research in these areas. With field centres in Biligiri Rangaswamy Temple Sanctuary, Kalakkad Mundanthurai Tiger Reserve and Vembanad wetland ecosystem, and an active Eastern Himalaya initiative, we have an opportunity to make both local impacts as well as to provide models and insights for large scales.

While ATREE has done well as a knowledge generating institution, there is much to be done in translating that to policy and action. As an academic myself, I recognise that it can be hard to step outside one's comfort zone (some would call it an ivory tower) and confront the real world. Nevertheless, we are as a community determined to meet that challenge together.

It remains my firm belief that the key to enduring change, including in our relationship with the environment, lies in the values we promote as a society. Much of academia in India, like the rest of our society, remains severely hierarchical and restrictive, even in many of our esteemed elite and national institutions.

But the most creative science and solutions come from freedom, to think, act, and be inspired. This is essential to achieve one of our main goals, to create future environmental scholars and leaders. The issues that we work on are no laughing matter, but there is no reason that we should not have fun while figuring out how to fix them! ATREE therefore aims to be an organisation that abhors straight lines. In our research and our culture, we aim not just to follow in the footsteps of the best, but to blaze (winding) trails that they can follow.

**Kartik Shanker**  
Director, ATREE



## Recognitions and Achievements

2015 – 16

From water access to climate change mitigation and from wetland conservation to sustainable development, fellows and students from ATREE were recognised for their contributions.

ATREE was ranked 19<sup>th</sup> in the top 100 think tanks of the world as per the 2015 The Global Go To Think Tank Index Report released by the Think Tanks and Civil Societies Program (TTCSP) of the University of Pennsylvania, Philadelphia, USA.

G Ravikanth is an ATREE fellow working for the Biodiversity Monitoring and Conservation Planning Programme was awarded the Erasmus Mundus Action II Scholarship for Networking and Mobility Actions for Sustainable Technology and Environment (NAMASTE) to Uppsala University in Sweden.

Veena Srinivasan, Sharachchandra Lele, and Karthik Madhyastha’s research article, “Why is the Arkavathy River drying? A multiple-hypothesis approach in a data-scarce region” won the Jim Dooge Award 2015 for the best paper in the Hydrology and Earth System Science journal by the European Geophysical Union.

Abi Tamim Vanak received the Clinical and Public Health Fellowship (Intermediate) awarded by Wellcome Trust/ DBT India Alliance.

Chandrima Home was given the Woman Scientist ‘A’ Award by the Department of Science and Technology (DST), Government of India.

Ovee Thorat’s work on the Banni grasslands was awarded the Carl Zeiss Wildlife Conservation Award.

Rahul Muralidharan received the Global Fellowship in Marine Conservation at Duke University Marine Lab, Beaufort, NC, USA.

Siddhartha Krishnan was elected a member of the Executive Committee at the Carson Society of Fellows, Rachel Carson Center for Environment, Munich, Germany.

## Research Highlights

ATREE’s research is spread across six major programmes across its two centres in India.

### Centre for Environment and Development

#### WATER, LAND AND SOCIETY

The programme’s aim is to generate usable insight that can help identify social, technological and governance solutions to India’s water problems.

**FACULTY:** Dr. Veena Srinivasan (Programme Leader), Dr. Bejoy Thomas, Dr. Durba Biswas, Dr. Priyanka Jamwal, Dr. Shrinivas Badiger and Dr. Sharachchandra Lele.

#### FORESTS AND GOVERNANCE

This programme aims to influence the forest policy debate by incorporating the changing socio-economic contexts of local communities, the importance of historically-situated and locally nuanced forest rights arrangements, and the need for institutional arrangements that link local and global stakeholders in a fair manner.

**FACULTY:** Dr. Siddappa Setty (Programme Leader), Dr. Sharachchandra Lele.

#### CLIMATE CHANGE MITIGATION AND DEVELOPMENT

This programme aims to find approaches to decouple economic growth and greenhouse gas emissions and harness co-benefits for local environment, health, and energy security.

**FACULTY:** Dr. Sharachchandra Lele (Programme Leader), Ms. Ulka Kelkar and Dr. Megha Shenoy (Adjunct Faculty).

### Centre for Biodiversity and Conservation

#### BIODIVERSITY MONITORING AND CONSERVATION PLANNING

This programme aims to describe, assess and monitor biodiversity across scales, taxa, and landscapes, apply broad interdisciplinary approaches to conservation planning, and catalyse adaptive management practices to further ecological sustainability.

**FACULTY:** Dr. R. Ganesan (Programme Leader), Dr. Priyadarsanan Dharma Rajan, Dr. G. Ravikanth and Dr. N.A. Aravind.

#### LANDSCAPES, LIVELIHOODS AND CONSERVATION

This programme aims to examine the contrasting and synergistic strengths of natural and social drivers in environmental change at the landscape level and find solutions that enhance both conservation and livelihoods.

**FACULTY:** Dr. T. Ganesh (Programme Leader), Dr. Ankila Hiremath, Dr. Abi Tamim Vanak and Dr. Nitin Rai.

#### ECOSYSTEM SERVICES AND HUMAN WELLBEING

This programme aims to understand the various dimensions of ecosystem services and introduce it into ongoing and new societal and policy discussions.

**FACULTY:** Dr. Jagdish Krishnawamy (Programme Leader), Dr. Soubadra Devy and Dr. Siddhartha Krishnan.



Centre for Environment and Development

## Water, Land and Society

This programme's faculty members have been engaged in several large research projects. Two major interdisciplinary research projects in urbanising watersheds are nearing completion and have already resulted in several peer-reviewed publications, discussion papers and conference papers. These projects involved training dozens of young researchers, who worked as research associates and interns.



Left: Local communities draw a map of their village in Chikkakuntanahalli, Karnataka © Bejoy K Thomas



Top: The Vrishabhavathy river in Karnataka carries Bengaluru's wastewater to irrigate farms downstream © Nakul Hebale

Above: Monitoring a check dam in the TG Halli catchment in the outskirts of Bengaluru, Karnataka. © Rahul Varier

### ADAPTING TO CLIMATE CHANGE IN URBANISING WATERSHEDS (ACCUWA)

This is a three-year interdisciplinary research study focusing on two rapidly urbanising watersheds in south India: the Arkavathy sub-basin in Karnataka and the Noyyal sub-basin in Tamil Nadu. This study, supported by International Development Research Centre (IDRC) Canada, highlighted how water quality and availability is changing with increasing urbanisation, industrialisation, climate change, and high rates of urban consumption. The study also attempted to model ground water flows in hard-rock aquifers. The project's insights revealed how the TG Halli Reservoir, which provided water to Bengaluru a few decades back, is now facing acute water shortage. Some of the important contributions of this project involved submission of inputs to a National Level Committee on restructuring of the Central Water Commission (CWC) and the Central Groundwater Water Board (CGWB), launching of a Water Literacy and a Participatory Groundwater Monitoring programme in several villages, submission to a 'Model bill for the Conservation, Protection, Regulation and Management of Groundwater, 2016' and inputs to the National Water Framework Bill.

### AGRARIAN, ENVIRONMENTAL CHANGE AND URBANISATION

This five year research project, funded by the Tata Trusts, had its focus on the Vrishabhavathi and Suvarnamukhi catchments, both of which originate and lie partly in the Greater Bengaluru region. The project aimed to understand the socio-economic and environmental implications of urbanisation on peri-urban areas and villages that lie close to expanding cities. Through extensive field visits and using GIS and census data, researchers helped develop detailed profiles of villages in the catchments. The study involved in-depth field research in six villages (three in each catchment) including a participatory rural appraisal (PRA), questionnaire survey covering a total of 156 households, and water sampling at the household level and from community level sources (streams, bore wells, hand pumps and open wells). The project also returned information to the communities through six village level dissemination meetings. In addition, a preliminary assessment of water quality in the urban stretch of Bengaluru (done in conjunction with the ACCUWA project) in the highly polluted Vrishabhavathi river was also conducted. Results of urban water quality assessment as well as field research in downstream villages of Byramangala reservoir, where water from the Vrishabhavathi river is used for irrigation, led to insights about why pollution control has been ineffective.

With these projects coming to a close, the programme will now shift its attention towards lakes of Bengaluru and their ability to satisfy multiple competing objectives of water security, flood protection and environmental amenities.

### OUTREACH

The WLS programme conducted a Summer School in Water and Society in 2015 for 23 Master's degree holders, representing a range of backgrounds to explain the principles of problem-driven research. The programme also helped organise a policy round table on urban water issues at the 8th Biennial Conference of the Indian Society of Ecological Economics (INSEE).



Centre for Environment and Development

## Forests and Governance

The Forests and Governance programme analyses the performance of local forest institutions, empowers communities to claim rights under the Forest Rights Act (2006), and studies the influence of forest governance regimes on the distribution of forest ecosystem benefits. The programme also conducts action-research on enterprise linked conservation of Non-Timber Forest Products (NTFPs), studying the long-term ecological dynamics of NTFPs.



Several communities living in the fringes of Biligiri Rangaswamy Temple Tiger Reserve in Karnataka depend on agriculture for their livelihood © Siddappa Setty

### MANAGING FORESTS FOR BIODIVERSITY AND HUMAN WELLBEING IN THE FACE OF GLOBAL CHANGE

This four year project, funded by the US Agency for International Development (USAID), aims at sustainable use of Non-Timber Forest Products (NTFP), helping villagers add value to NTFPs with improved processing and marketing strategies, and increasing the incomes of communities with the use of new agricultural products and techniques. This project aims to reduce greenhouse gas emissions and understand and mitigate chronic crop-raiding that reduces pre-harvest productivity. This project is being conducted in two contrasting biodiversity hotspots of India – Singalila National Park and Sanchal Wildlife Sanctuary in Darjeeling and the Biligiri Rangaswamy Temple Tiger Reserve, Cauvery Wildlife Sanctuary and Malai Mahadeshwara Hills Wildlife Sanctuary in the Western Ghats, Karnataka.

### SENTINEL LANDSCAPES – LONG-TERM MONITORING OF LAND, FORESTS AND LIVELIHOODS

This is a two year project conducted in the Western Ghats covering four districts across Karnataka, Tamil Nadu and Kerala. As a part of the Sentinel Landscapes Framework Assessment, this project is a research study that spans several global biodiversity hotspots, conceptualised by the International Centre for Research in Agroforestry (ICRAF). It examines the relationship between livelihoods and land health in forested landscapes that have undergone land-use change. Through long term ecological and socio-economic data monitoring from across cultures, institution types and governance styles,



this project aims to contribute to a more nuanced understanding of global perspectives on forest health.

### OUTREACH

In collaboration with the Tata Institute for Social Sciences (TISS), the programme provided advisory support for the creation of Community Forest Resource (CFR) Management Plans in Gondia District, Maharashtra. This project was initiated by the Maharashtra Government to initiate CFR management planning in 10 villages of Gondia district in eastern Maharashtra. Advisory inputs were provided to the TISS team for ecological and socio-economic data collection, mapping of forest resources and forest rights boundaries, and identification of villages where CFR management can be pursued in the next phase.



Top: NTFP processing at household level at Cauvery Wild life Sanctuary

Above: Enhanced processing techniques have helped non-timber forest produce harvesters add more value to their products in Biligiri Rangaswamy Temple Tiger Reserve, Karnataka © Siddappa Setty





Centre for Environment and Development

## Climate Change Mitigation and Development

A new initiative launched this year, the Climate Change Mitigation and Development (CCMD) programme aims to understand how social, institutional and behavioural factors enable or impede sustainable, equitable and low-carbon development pathways. The programme initiated studies on renewable energy generation, waste management, and consumption behaviour in urban areas.



Field work to understand solid waste management policies and practices in Bengaluru © Megha Shenoy

### ROOFTOP SOLAR ENERGY GENERATION IN RAMANAGARA TOWN, KARNATAKA

This project, funded by the Environment Management and Policy Research Institute, Government of Karnataka (EMPRI), is investigating household behaviour and institutional barriers regarding the adoption of renewable energy and energy efficiency in a small city. The study covered 30 households and focused on the implementation of rooftop solar photo voltaic (RTPV) with net metering, and the switch to LED lighting under the Domestic Efficient Lighting Programme (DELP) in the city of Ramanagara in Karnataka. Having already provided valuable insights into how renewable energy can be adopted in emerging cities, the faculty now hope to further explore how policies should be designed and implemented to maximise the adoption of renewable energy in the housing sector in emerging cities.

### COMMUNITY-BASED WET-WASTE COMPOSTING IN BENGALURU, INDIA

This study, a collaboration with Sichuan University, China, involves a comprehensive investigation of the design and implementation of community-based garbage segregation and composting in Bengaluru, drawing lessons from Bengaluru, and integrating practice and lessons learned from other documented wet-waste composting models across the world.

### TN KHOSHOO MEMORIAL AWARD AND OTHER OUTREACH ACTIVITIES

This year's T.N. Khoshoo Memorial Award was focused on the theme of Climate Change, and the recipient was Dr. Navroz Dubash from the Centre for Policy Research, New Delhi. On the occasion of the award-giving ceremony, the CCMD programme organised a panel discussion on 'Looking Beyond Paris: Strategies for an equitable and low carbon future' moderated by

Dr. Satish B. Agnihotri, former Secretary, Minister of New and Renewable Energy, Government of India.

The CCMD programme participated in a number of workshops, training programmes, and meetings hosted by various organizations, including Ministry of Environment, Forests and Climate Change (Delhi), Centre for Policy Research (Delhi), Tata Institute of Social Sciences (Mumbai), Indian Institute for Human Settlements and Centre for Sustainable Development (Bengaluru). The programme trained several Karnataka government officials from the energy, agriculture and fisheries sectors in a series of capacity building programmes organised by EMPRI for the Karnataka State Action Plan on Climate Change. It also trained women scientists on "Sustainability of agricultural livelihoods: Multiple stresses and limits to coping" in "Science for Progress in India: Focus on Sustainability", organised by National Institute for Advanced Studies (NIAS), Bengaluru.



Centre for Biodiversity and Conservation

## Biodiversity Monitoring and Conservation Planning

The Biodiversity Monitoring and Conservation Planning programme generates knowledge through applied research and outreach activities by using integrative taxonomy, and monitoring biodiversity and ecosystem changes. The programme aims to improve management of biodiversity and ecosystems through a variety of outputs that could potentially influence existing policies and conservation planning.

### CONSERVATION OF CRITICALLY ENDANGERED AND ECONOMICALLY IMPORTANT SPECIES AND THEIR HABITAT IN THE WESTERN GHATS

This project, funded by the Department of Biotechnology, Government of India, focused on an evolutionarily and economically important plant group—five species of wild nutmegs, belonging to the family *Myristicaceae*—to model the impacts of climate change on the potential distribution of these species. The research revealed an overall increase in suitable habitats for the wild nutmeg species that are not restricted to swamps, while swamp species such as *Gymnocranthera canarica* and *Myristica fatua* were found to be affected by the changing climate owing to reduced habitat. These species already have restricted habitat due to human use of their habitats for cultivation, and climate change threatens to shrink them further.

### ECOLOGY OF LAND SNAILS IN WESTERN GHATS

Funded by the Ministry of Environment and Forests, Government of India, this project uses ecological niche models to estimate the distribution and spread of the African Giant Snail (*Achatina fulica*), considered to be among the world's 100 worst invasive alien species. The niche models predicted that certain currently un-invaded areas will be more prone to invasion in the future. These regions include southern Karnataka and parts of Gujarat, Bihar, and Assam. The Andaman and Nicobar and Lakshadweep Islands are highly vulnerable to invasion under changed climate regimes. The study found, however, that the central Indian region is at low risk due to high temperature and low rainfall.

### LONG TERM MONITORING PROJECTS

These monitoring projects aim to understand the threats posed by anthropogenic disturbance and human induced climate change on tropical forests. The programme set up three 1 ha plots in the wet evergreen forests of Kalakad Mundanthurai Tiger Reserve (KMTR), Tamil Nadu, which were monitored over a 20 year period, and ten 1 ha plots in the dry deciduous forests of Biligiri Rangaswamy Temple Tiger Reserve, which were monitored over a 15 year period. These long term monitoring projects aim to predict tree species' ability to survive in the context of changing rainfall and temperature. The findings revealed that non-endemic species die slowly with a 62% decrease in their hazard rate while species endemic to Western Ghats were more robust with about 80% decrease in their hazard rates.

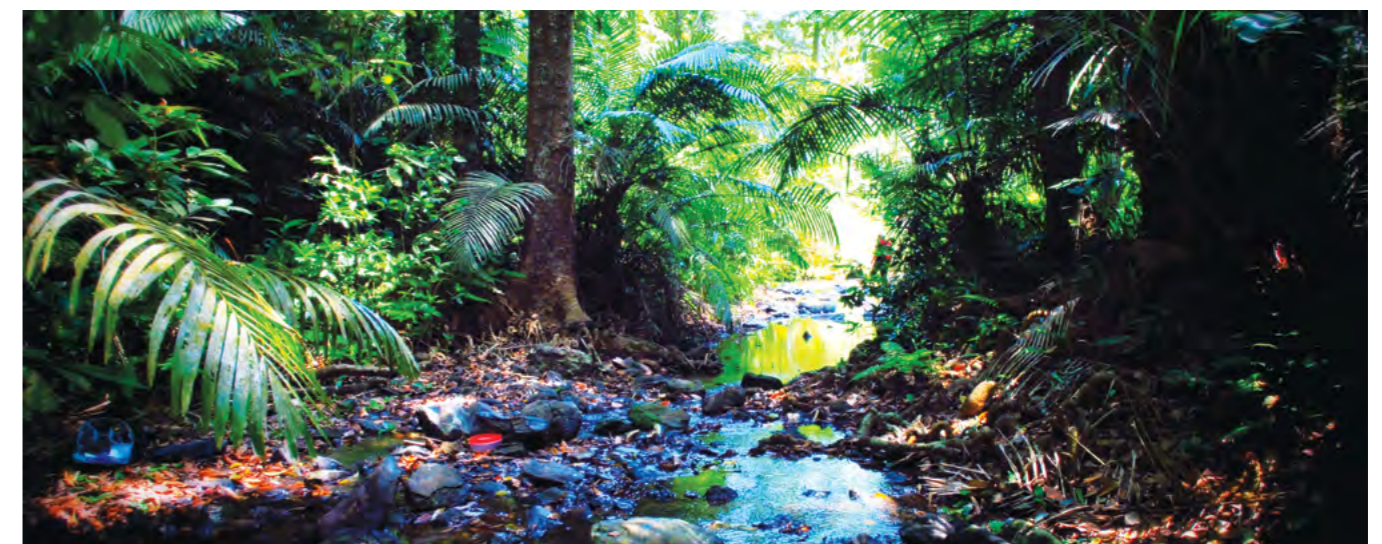
The findings of these research projects could potentially equip researchers in understanding the pattern of alien species invasion, which could help formulate policies that curtail the spread of invasive species. The programme's insights into the impacts of climate change on native species are also important for prioritizing conservation efforts of endemic species which inhabit fragile ecosystems. Long term monitoring has led to insights on key trends of local land use changes that impact climate and are in turn reflected in the annual life-phases of plants inhabiting the area.

As part of the biodiversity documentation research, a new species of ant, *Anochetus daedalus* was discovered this year from Sirsi, in the Uttara Kannada district of Karnataka.

Top: The invasive alien species: *Achatina fulica* (African Giant Snail) © Aravind

Middle: Nest entrance of the new species of ant, *Anochetus daedalus* discovered in Sirsi, Karnataka © Aniruddha Marathe

Bottom: A *Myristica* swamp in the Western Ghats, Karnataka © Roshmi Rekha Sharma





Centre for Biodiversity and Conservation

## Landscapes, Livelihoods and Conservation

The work of the Landscapes, Livelihoods and Conservation programme is focused on examining ecosystem processes across different types of landscapes (ranging from arid and semi-arid grasslands to Savannah and moist forests). The programme is also involved in studying the different 'natural' and 'social' drivers that feed into and affect these processes.



### MOVEMENT STRATEGIES FOR COMMENSALISM: COEXISTENCE OF MES-CARNIVORES IN HUMAN-DOMINATED LANDSCAPES

In collaboration with the Centre for Ecological Sciences, Indian Institute of Science in Bengaluru, the project aims to identify patterns of resource use and movement for all meso-carnivore species across a landscape mosaic using a combination of very high-resolution Earth observation data and advanced GPS telemetry. The project aims to determine the ecological parameters and behavioural strategies that enable the occurrence of the golden jackal, Indian fox and jungle cat in human-dominated systems. Based on their movement data, researchers determined key resting/denning sites, foraging areas, residency time in forage patches and pathways of use that link resource patches. These data allow researchers to model the fine-scaled movement strategies of meso-carnivores that permit the use of modified landscapes, and determine the thresholds of tolerance to landscape change.



### ONEHEALTH TO RABIES RESEARCH IN INDIA: INTEGRATING ANIMAL ECOLOGY, DISEASE ECOLOGY AND HUMAN HEALTH

This DBT/Wellcome Trust funded project conducts rabies research in India. The project aims to elucidate the spread of rabies and is being conducted in the state of Maharashtra to improve national policy on the control and prevention of the disease. This project integrates the fields of animal ecology, disease ecology, and human health to understand whether rabies spreads from high density dog populations in urban areas to rural areas, how it spills over or back from dogs to wild carnivores, and the effectiveness of ongoing vaccination strategies in combating rabies. It also addresses the scale of underreporting and treatment of rabies victims in rural areas.



Top: Nomadic pastoralists in the Banni grasslands of Kutch, Gujarat.

Top Right: An Indian fox peering out of its burrow in Kutch, Gujarat.

Above: A desert fox spotted in the Banni Grasslands, Kutch, Gujarat.

© Ovee Thorat

The programme also organised a consultation workshop on the 'Conservation Prioritisation of Semi-Arid Savannah Grasslands of the Deccan plateau.' The workshop was attended by 30 forest department officials, scientists and irrigation department officials.



Centre for Biodiversity and Conservation

## Ecosystem Services and Human Wellbeing

This programme conducts projects across the states of Sikkim, Tamil Nadu and Madhya Pradesh on varied topics such as climate change adaptation, distribution of and access to ecosystem services, and eco-hydrology. This programme aims to benefit communities dependent on forests and affected by changing weather patterns (especially extreme rainfall events), as well as policy makers.



Pollinators continue to be threatened by various anthropogenic pressures and climate change in Darjeeling, West Bengal © Siddhartha Krishnan

### ECOLOGICAL FLOWS

This study attempted to estimate the ecological flow requirements and understand the effects of modified flow regimes on the movement and nesting sites of gharials in the Son Gharial Sanctuary. The results have been communicated to the government and judiciary for better management of the sanctuary. The study also prescribes ecological flow regimes which can help meet downstream demands for water from the Bansagar Dam without causing significant damage to wildlife habitats in the sanctuary.

### ECOSYSTEM SERVICES IN THE EASTERN HIMALAYAS

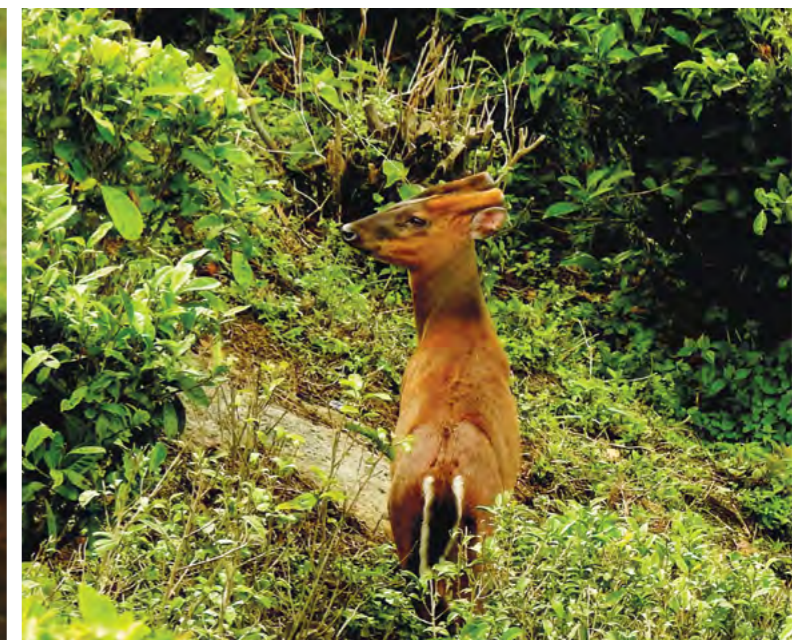
This project, supported by Department of Biotechnology, Government of India, aimed to (a) map the distribution and abundance of bio-resources, (b) investigate the potential impacts of climate change on their distribution and diversity, and (c) quantify the economic value of ecosystem services in the Eastern Himalayas. Having compiled extensive datasets on the richness, composition and spatial distribution of biodiversity across the Sikkim landscape, the project established and developed monitoring programmes, and initiated long-term experiments to understand and quantify the impacts of future climate change on community and ecosystem level process in the Sikkim Himalaya. The project also developed and strengthened linkages with regional institutions and communities, and built capacity in Sikkim by training and developing a cadre of young local researchers.



Left: Adult male gharial basking in the Son Gharial Sanctuary © Tarun Nair

Bottom Left: A Himalayan salamander

Bottom Right: A foraging barking deer in Darjeeling, West Bengal © Annesha Choudhary



### INTEGRATED APPROACHES FOR ADAPTIVE RESILIENCE-BASED MANAGEMENT OF FORESTS FOR SUPPORTING AGRO-SYSTEMS IN THE SIKKIM-DARJEELING HIMALAYAS

Funded by the Department of Science and Technology, Government of India, this project examines the bundle of ecosystem services comprising water, pollination, soil and NTFPs, in areas with varying levels of protection in Darjeeling. It is being conducted in two forested regions, the Singalila National Park and the Senchel Wildlife Sanctuary in Darjeeling.

### IMPACTS OF FORESTATION ON WATER CYCLE AND HYDROLOGIC SERVICES IN THE WESTERN GHATS

This three-year project with support from National Environment Research Council, UK and Ministry of Earth Sciences, Government of India (in collaboration with the University of Dundee-UK, National Centre for Biological Sciences-Bengaluru, Foundation for Ecological Research, Advocacy and Learning-Pondicherry) focuses on understanding the spatial distribution of rainfall, specifically extreme rain storms, and how this interacts with different land-use and land-cover in large landscapes to influence stream water quality and

quantity, besides carbon dynamics in response to climate extremes. This project is being conducted in the Western Ghats.

#### ADAPTATION AT SCALE IN SEMI-ARID REGIONS (ASSAR)

This five-year research project, supported by the UK's Department for International Development (DFID) and Canada's International Development Research Centre (IDRC) under the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) programme, was initiated in March 2014. The India component of the consortium also includes Indian Institute for Human Settlements and Watershed Organization Trust. Focusing on three distinct semi-arid landscapes, the premise of this research initiative is that by the middle of this century, the impacts of climate variability and change, along with environmental depletion, may require radical changes in how people utilise land and water resources. It examines how climatic, biophysical, social, political, and economic factors interact in semi-arid regions,

and produces scenarios and practical approaches for communities and decision-makers to develop strategies for adapting to changes in the climate and the environment. It has produced new evidence to help communities prepare for likely changes in areas where demographic trends, development approaches, and land-use and land-cover change put large numbers of people and their livelihoods at risk.

The ESWH programme trained 24 participants representing 11 districts from the Meghalaya Water Resources Development Agency. The workshop was jointly supported by the Changing Water Cycle Programme, Ministry of Earth Sciences, the Government of India, and the Department of Water Resources, Government of Meghalaya. It organised another 'Training Workshop in Field Hydrology' in the Western Ghats in August 2015, also supported by the Changing Water Cycle Program.



A new community of ecologists with an appreciation for hydrology @ Susan Varughese

## Community Conservation Centres



The Community Conservation Centres (CCC) facilitate a two-way flow of knowledge between local stakeholders and researchers at ATREE. They act not only as field bases for doctoral research, but also provide a space for monitoring socio-ecological systems. The CCCs have been instrumental in reaching out to and building capacities of local community, community institutions, forest officials, environmental journalists and visiting students, including those participating in study-abroad programmes.

#### AGASTHYAMALAI COMMUNITY CONSERVATION CENTRE

FACULTY: Dr. R. Ganesan, Dr. Soubadra Devy and Dr. T. Ganesh

#### VEMBANAD COMMUNITY ENVIRONMENT RESOURCE CENTRE

FACULTY: Dr. Priyadarsanan Dharma Rajan

#### BILIGIRI RANGASWAMY AND MALE MAHADESHWARA HILLS COMMUNITY CONSERVATION CENTRE

FACULTY: Dr. Siddappa Setty

The four Community Conservation Centres form an integral part of ATREE conducting a host of activities with community participation, which include research, outreach, livelihood enhancing programmes, capacity building, education and building awareness. The CCCs have also been instrumental in providing policy level interventions.

#### AGASTHYAMALAI COMMUNITY CONSERVATION CENTRE

The Agasthyamalai Community Conservation Centre (ACCC) was established in the foothills of Agasthyamalai by ATREE in 2001, to reach out to local stakeholders about the importance of the Agasthyamalai forest through research and outreach programmes in and around Kalakad Mundanthurai Tiger Reserve (KMTR) and in the Tirunelveli and Thoothukudi districts. The goal was to assess biodiversity and land-use changes over time and space and also to assimilate community knowledge and learnings to provide inputs towards biodiversity management and its sustainable use.



River from Agasthyamalai forest Kallar Kadana © Rengaiyan Ganesan



Local communities in Vembanad, Kerala indulge in impromptu fishing © Samson P Samuel

ACCC not only addresses issues pertaining to biodiversity management at the regional scale, but it also aims at upscaling the learnings therein to a larger landscape by research and actively engaging with communities, conservation practitioners and policy makers.

The ACCC has addressed several conservation issues, which required immediate research inputs. It was instrumental in the documentation of bird diversity in a wetland, which helped in the conservation of a heronry, which would have otherwise been vulnerable to tree felling.

#### VEMBANAD COMMUNITY ENVIRONMENTAL RESOURCE CENTRE

In 2005, ATREE initiated the Vembanad Wetland Conservation Programme. The conservation programmes for Vembanad are implemented through the Community Environmental Resource Centre (CERC), which was established in Alappuzha, Kerala in 2007.

The programmes anchored at the CERC adopt a multi-pronged approach to strengthen communities and institutions for the sustainable management of Vembanad's backwaters, a vital source of several livelihoods. CERC has evolved six major intervention strategies through a series of stakeholder interactions that ultimately culminated in implementing livelihood activities vis-à-vis lake conservation. The key strategies involved facilitating policy dialogues, awareness creation and capacity building of the stakeholders,

community based water quality monitoring, establishing a knowledge repository of Vembanad lake and strengthening ecosystem elements to enhance fisheries and agri-based livelihoods. CERC continues to create networks involving primary as well as secondary stakeholders and has emphasised the institutionalisation process from its inception.

The CERC organises unique initiatives, such as 'Jalapaadam' (lessons on water), which harness the local communities to aggregate and build a biodiversity inventory of the local region through crowd sourcing. The Vembanad Bioblitz is another unique event organised by the CERC which provides a platform for school children to identify and document local biodiversity, help in preparing biodiversity inventory of the locality, and build and sustain their interest in monitoring and the conservation of biodiversity of the region. The programme targeted eight village schools in the Vembanad area, which are part of "Jalapaadam" programme. Several students and teachers have been trained through this initiative.

The students uploaded a total of 3230 observations to the India Biodiversity Portal (IBP), out of which around 70% have been identified by the students and portal community. Overall observations included plants (1444), arthropods (471), birds (141), fishes (86), reptiles (32), mammals (12), amphibians (11), fungi (9), molluscs (6) etc. An important outcome of the Bioblitz was the rediscovery of *Orsinome marmorea* Pocock (1901), a tetragnathid spider, after 113 years.

#### BILIGIRI RANGASWAMY TEMPLE AND THE MALE MAHADESHWARA COMMUNITY CONSERVATION CENTRES

ATREE's first Community Conservation Centre (CCC) was established at BR Hills in 1992 by Prof. Kamaljit S Bawa, a founding trustee of ATREE. One of the first projects in the region was monitoring of Non Timber Forest Products (NTFPs), an area of study that continues to be one of the mainstays of this CCC. Research into NTFPs and other forest fruits also led to a project in the Male Mahadeshwara (MM) Hills, following which the MM CCC was established in the year 2008. Both these CCCs serve as forums to teach resident communities to conserve and protect their environment so as to enable continuous and productive harvesting of forest resources. The CCC also conducts classes to provide livelihood sources for better sustenance of the residing community.

In the BRT CCC, work on increasing yield in Soliga tribals' agricultural-land with 25 farmers using line and contour sowing techniques led to increase in the crop yield by 25%. Inspired by the training, the Soligas have started producing worm composts and green manure as well. Traditional agricultural seed conservation studies and activities were conducted with the Soliga farmers. Based on the studies, 152 varieties of seeds have been grown by the Soliga farmers. To protect these seeds, decentralised seeds banks have been encouraged.

The WIPRO-Earthian programme at ATREE, anchored at the BRT CCC, helped support a workshop to facilitate teaching biodiversity through experiential learning methods. Fifteen teachers from different states participated in the five-day workshop conducted at Biligiri Community based Conservation Centre, Biligiri Rangaswamy Temple Tiger Reserve, Karnataka. The workshop led to the development of a workbook and teachers' manual which have been introduced into the National Council for Educational Research and Training (NCERT) curriculum. The workshop aimed at training teachers to communicate about biodiversity and conservation through discussions and hands-on activities that are different from the conventional classroom based teaching.

ATREE pioneered a novel and innovative approach to enhance the livelihoods of the Soliga community, an indigenous community who have historically inhabited these areas, through the use of the invasive weed *Lantana camara* at Male Mahadeshwara (MM) Hills Wildlife Sanctuary. In a decade, ATREE has trained 350 Soliga people to use this craft for their livelihoods. *Lantana* forms a good substitute for bamboo. With the intention of transferring ownership, ATREE started 'Lantana Craft Centres (LCC)' and handed it over to the Soliga artisans. Currently, there are two LCCs that are being handled by the Soligas with 25 Soliga artisans (10% of people in two villages) working on lantana crafts and earning an average of Rs. 2500 to Rs. 4000 per month.



Construction of ATREE's field station in the Biligiri Hills, Karnataka © Mathivanan M



# ATREE Eastern Himalaya/ Northeast India Initiative

FACULTY: Dr. Sarala Khaling

To help the region of Eastern Himalayas/ Northeast India develop multi-functional landscapes where biodiversity is protected, ecosystem integrity maintained and the well-being of its people promoted.



Landscape at Namdapha Tiger Reserve © Rohit M. George.

### ATREE EASTERN HIMALAYA/NORTHEAST INITIATIVE GOALS:

The broad goals of ATREE’s Eastern Himalaya/Northeast Initiative are to:

- Assess and monitor regional biodiversity and ecosystem services.
- Support the development of sustainable landscape management systems by understanding the complex relationships between regional economic activity, forest resources, agriculture and climate change.
- Enhance the regional science-policy interface by bringing stakeholders together to strengthen governance and institutions for coping with environmental change, including climate-induced disaster risk.
- Build regional human capacity to meet the challenges of environmental change.
- Strengthen existing knowledge and action networks among civil society organizations, government agencies, and local communities to build resilience to environmental change.

### INTEGRATED APPROACHES FOR ADAPTIVE RESILIENCE-BASED MANAGEMENT OF FORESTS FOR SUPPORTING AGRO-SYSTEMS IN SIKKIM-DARJEELING HIMALAYAS

This project aims to understand how Eastern Himalayan social-ecological systems can be managed and governed to generate a sustained supply of ecosystem services and support associated livelihoods without impairing key ecosystem attributes and functions (e.g. nutrient cycling, ground water recharge and biodiversity). Preliminary interactions with communities revealed that communities living in the proximity of reserved forests and protected areas such as the Singalila National Park and Senchel Wildlife Sanctuary are highly dependent on the ecosystem services of the forest ecosystem in the form of various tangible benefits such as the provisioning of fuel wood, fodder, clean drinking water and intangible benefits through the aesthetics of biodiversity appreciation and recreation services.

The framework includes the measurement of the condition of forests in terms of desirable ecosystem functioning to understand how ecosystem services support or constrain the achievement of human well-being such as bodily health, aspirations and concern



Paddy field adjacent to Manas National Park ©Brojo Basumatary

for other species and whether households are able to achieve a minimum level of these capabilities. It also considers whether the achievement of well-being ensures sustenance of ecosystem process and functioning for a continued flow of ecosystem services. The research highlights some of the key social attributes and functions such as adaptive governance, transformability, learning and capabilities that are necessary for maintaining resilience in the face of changes such as land-use, climate and uncertainties in form of shocks and disturbances.

**MANAGING INDIA’S FORESTS FOR BIODIVERSITY AND HUMAN WELLBEING IN THE FACE OF GLOBAL CHANGE**

The Eastern Himalaya component of this project, funded by the US Agency for International Development, focuses on managing forest ecosystems and societal interactions with the forest in the face of global environmental and economic change. The project focuses on two protected areas in Darjeeling Hills, the Singalila National Park (SNP) located in the western part of Darjeeling district, designated a National Park in 1992 and Senchel Wildlife Sanctuary (SWLS), located on the outskirts of Darjeeling town and designated as a Wildlife

Sanctuary in 1915. Foregrounding the objective of active participation of the community in managing forest resources, the project on the Eastern Himalayan region documents the climate and land use patterns to introduce various methods and techniques for improving resilience of agro-ecosystems in mitigating climate change and biodiversity loss thereby enhancing and restoring biodiversity in forests and agro-ecosystems.

Despite the reliance of communities on non-timber forest products, the improvement of forest conditions is sought by introducing improved cooking stoves to decrease the use of fuel wood. Investments are made towards development of skills for off-farm employment enhancing rural incomes thereby withdrawing reliance of communities on forest resources.

Towards strengthening systems of forest resource management, the project focuses at policy initiatives bringing together local communities, non-governmental organizations and state government agencies to strengthen efforts towards decentralized and participatory governance.



Improved cook stove © Tenzing Sherpa



Indian Bison (*Bos gaurus*) inside Manas National Park © Brojo Basumatary

**INTEGRATED APPROACHES TO ENHANCE LIVELIHOODS SUSTAINABILITY OF COMMUNITIES IN THE FRINGE AREAS OF MANAS TIGER RESERVE (MTR), ASSAM**

The Project funded by Karl Kubel Stiftung is a step towards promoting conservation of the rich biodiversity of Manas through positive community interactions and sustainable development. The project aims to enhance livelihood sustainability of local communities dependent on the resources of Manas through three focused approaches (i) institutional development, (ii) climate smart sustainable agriculture (iii) mitigating human wildlife conflicts. The Project has collaborated with different sections of the society including universities, training institutions, government departments, local councils like Village Council Development Committee (VCDC), environment organizations, local and regional NGOs, resource persons and experts to work together for the common goal of sustainable development of the communities and conservation of the rich biodiversity of Manas.

Various local institutions like Eco Development Committee (EDC), Self Help Group (SHG), Farmers

Group (FG) and local NGOs have been formed and or strengthened by the project. The main purpose of strengthening these institutions is creation of platform for villagers to plan and execute development interventions and or conservation issues. Sustainable and climate friendly agriculture includes sensitisation for piloting new techniques like system for rice intensification, multi-cropping, horticulture, soil management, environment friendly techniques. Villages located around Manas landscape are most vulnerable to crop depredation by wildlife like, elephants, wild boars, etc. Crop depredation leads to economic loss of cash crops and food insecurity due to loss of food crops. The project has initiated various mitigation measures such as construction of watch towers in appropriate places for communities to ward off large mammals, forming bio-fencing through citrus and Sijou (*Euphorbia splendens*) plantation. Alternative livelihood supports are also provided to the communities in areas with intense crop depredation by wildlife which include horticulture, (especially fruits for income generation), apiary, vegetables (poly-houses), mushroom cultivation and medicinal plants cultivation.





## HUMAN-WILDLIFE INTERACTIONS

Tourism in red panda landscape looks into the challenges faced by nature tourism permitted in the red panda habitats of Darjeeling–Sikkim Himalaya for implementation of appropriate strategies to promote sustainable and responsible nature tourism. Our assessment of tourism in Singalila National Park, Neora Valley National Park in Darjeeling has generated an explicit understanding of challenges to sustainable and responsible nature tourism in the red panda habitats. Assessment findings from Singalila National Park seeks to strengthen management strategies for sustainable nature tourism. Seven local guides are now being intensively trained as Master Guides who would then train other guides in the region through the project. Interpretation materials like posters have also been developed. 12 mounted posters on Singalila were recently handed over to the Darjeeling Wildlife Division, Department of Forests, government of West Bengal.

Work on the critically endangered Chinese Pangolin in areas outside Protected Areas is assessing the status of the Chinese Pangolin, *Manis pentadactyla*, in tea plantations of Darjeeling and conducting extensive awareness programs, awareness materials, and promoting commitments to protect the species. Further to this the ongoing project will be setting camera traps for the species to better understand the ecology of this highly threatened and elusive species.

Work on the dietary use of wild edible fruits by the local community and the hornbills in the lowland forests of Darjeeling Himalaya has documented 70 species of wild edible fruits, three species of hornbills from the Neora Valley National Park and its surrounding areas. A wild fruit dietary overlap of 44% between the hornbills and the local community was found. Awareness programs for local school children were held and now a booklet on the wild edible fruits of the region is being developed.

## CITIZEN SCIENCE FOR DOCUMENTING BIODIVERSITY

Despite Northeast India being an area rich in biodiversity and endemism and holding a large number of rare species that are now under serious threat much remains to be documented. The general public along with scientists and researchers can play a vital role in documenting this rich biodiversity and sharing this information through a web based platform. The India Biodiversity Portal (IBP) is an open access biodiversity informatics platform that seeks to aggregate biodiversity information for India through participation. Launched in 2008, the platform currently has nearly 8,000 registered users comprising of experts and enthusiasts.

North East India Biodiversity Portal (NEIBP) was launched as part of the larger India Biodiversity Portal. A year-long campaign through 13 workshops were held in all the 8 Northeastern states and North Bengal India with 315 participants garnered support for this movement of biodiversity documentation. Before the launch of NEIBP in September 2015, there were 8,605 observations from Northeast India on IBP. Since then, more than 20,000 observations have been contributed by users and a wide network of stakeholders has been formed who are partnering with ATREE to document the rich biodiversity of the region.

Opposite Page Top: Watch Tower, Manas  
© Brojo Basumatary

Opposite Page Bottom: Weeding potato  
fields © Tenzing Sherpa



## Academy for Conservation Science and Sustainability Studies

**43** PhD Students

**19** Faculty

**04** PhD Degrees Awarded

**31** Public Talks

**13** Internal Talks

**15** Interns

The doctoral programme at ATREE's Academy for Conservation Science and Sustainability Studies is recognised by the Manipal University (MU). It is designed to equip students with the knowledge and skills to understand and address complex conservation and environmental issues through an interdisciplinary framework.



ATREE's PhD programme endeavours to bridge the gap between natural and social sciences in its teaching and research on conservation science and sustainability studies. The programme focuses on building capacities for critical thinking and leadership and offers students the opportunity to ground their research in the field using ATREE's community-based conservation centres and other field sites throughout the country.

The students at the Academy design their own dissertation projects and have received grants for funding their research. The quality of the students' work is evident from their publications as well as their participation in international talks and conferences. Their success is reflected in the large number of awards, merits and fellowships they have received. Students who have graduated from the programme have joined

research and academic positions at well-known institutes in India.

The Academy recruited ten new students for the 2015 batch from diverse backgrounds which include wildlife biology, climate science and policy, psychology, genomics, natural resource management, environmental science and other allied sciences. Four students were awarded their PhD degree during the last year. For the first semester, the Academy offered four fundamental courses—Ecology, Environmental Science, Economics for Environment and Development, and Sociology and Anthropology for Environment and Development. The courses in the second semester included Integrated Approaches in Conservation, Environment and Society, Research Methods in Social Sciences and Sciences and Quantitative Methods.

**Facing Page:** Rosy starlings spotted in the Banni Grasslands, Kutch, Gujarat © Ovee Thorat

**Below:** ATREE researchers arrive in Kattalekan, Western Ghats of Karnataka © ATREE



# Publications



## JOURNAL ARTICLES

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## CONFERENCE PROCEEDINGS

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## OUR TEAM

Our passionate and committed team strives to make a difference.

### Faculty Affiliations

#### BIODIVERSITY MONITORING AND CONSERVATION PLANNING

- R. Ganesan, Programme Leader
- N.A. Aravind.
- Priyadarsanan Dharma Rajan
- G. Ravikanth

#### LANDSCAPES, LIVELIHOODS AND CONSERVATION

- T. Ganesh, Programme Leader
- Abi Tamim Vanak
- Ankila Hiremath, New Delhi
- Nitin Rai

#### ECOSYSTEM SERVICES AND HUMAN WELLBEING

- Jagdish Krishnaswamy, Programme Leader
- Siddhartha Krishnan
- M. Soubadra Devy

#### WATER LAND AND SOCIETY

- Veena Srinivasan, Programme Leader
- Bejoy K. Thomas
- Durba Biswas
- Priyanka Jamwal
- Shrinivas Badiger

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- Siddappa Setty, Programme Leader
- Sharachchandra Lele

#### CLIMATE CHANGE MITIGATION AND DEVELOPMENT

- Sharachchandra Lele, Programme Leader
- Ulka Kelkar

#### HONORARY FACULTY

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- K.R. Shivanna
- Rom Whitaker

- K.D. Singh
- G.K. Veeresh
- Madhav Gadgil

#### SENIOR ADJUNCT FELLOWS

- Gladwin Joseph
- R. Prabhakar

#### ADJUNCT FACULTY

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- T. O. Sasidharan
- Deepak Malghan
- Megha Shenoy
- Seema Purushothaman
- Narasimha Rao

#### VISITING FACULTY

- Sunita Pradhan
- Rajendra K. Puri

#### MANAGEMENT

- Kartik Shanker, Director
- Sridhar Ramaswamy Iyengar, Deputy Director, Finance and Administration
- Sarala Khaling, Regional Director, Northeast India Initiatives
- Sharachchandra Lele, Convener, Centre for Environment and Development
- Jagdish Krishnaswamy, Convener, Centre for Biodiversity and Conservation
- Nitin Rai, Academy Convener, Academy for Conservation Science and Sustainability Studies

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- Tania Bhowmick

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- Shiva Subramanya





## FUNDING PARTNERS

We would like to thank our donors and partners for their unwavering support.

### Research Grants

- Alliance of Religions and Conservation, UK
- Barr Foundation, USA
- Bombay Natural History Society, India
- Columbia University, USA
- Birdlife International, UK
- Department of Biotechnology, India
- Department of International Environment and Development Studies, Norway
- Environmental Management and Policy Research Institute, India
- Foundation Ensemble, Paris
- Government of Kerala, India
- Indian Institute for Human Settlements, India
- International Development Research Centre, Canada
- Indo-French Centre for the Promotion of Advanced Research, India

### Endowments

- Barr Foundation, USA
- Sarojini Damodaran Foundation, India
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- Ministry of Earth Sciences, India
- Ministry of Environment, Forest and Climate Change, India.
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- Science and Engineering Research Board, India
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- The National Academy of Sciences, USA
- The South Asian Network for Development and Environmental Economics, Nepal
- The Wellcome Trust - DBT India Alliance, India
- U.S. Agency for International Development, USA
- United Nations Development Programme, India
- University of Guelph, Canada
- Wipro Limited, India
- Xu Lianggen, China

## FINANCIALS

Place: Bengaluru

Date: 26 September 2016

### Independent Auditor's Report

To the Trustees of Ashoka Trust for Research in Ecology and the Environment (ATREE)

### Report on the Financial Statements

We have audited the accompanying financial statements of Ashoka Trust for Research in Ecology and the Environment (ATREE), which comprise the Balance Sheet as at March 31, 2016, and the Income and Expenditure account, Receipts and payments account for the year then ended and a summary of significant accounting policies.

### Management's Responsibility for the Financial Statements

Management is responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance and cash flows of the Entity in accordance with the accounting principles generally accepted in India. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

### Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of

India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

### Opinion

In our opinion and to the best of our information and according to the explanations given to us, the financial statements of Ashoka Trust for Research in Ecology and the Environment (ATREE) are prepared, in all material respects in conformity with the accounting principles generally accepted (GAAP) in India, to give a true and fair view of the state of affairs of the Trust as at 31st March 2016 and its surplus, receipts and payments for the year ended on that date.

For G. Anantha and Co.  
Chartered Accountants  
Frn: 005160S  
Rani N. R.  
Partner  
M. No. 214318

# Ashoka Trust for Research in Ecology and the Environment (ATREE)

Royal Enclave  
Srirampura, Jakkur Post  
Bengaluru - 560 064, India

BALANCE SHEET AS ON 31ST MARCH 2015				(INR IN LACS )	
SOURCES OF FUNDS		31st March 2016		31st March 2015	
Corpus Fund		4,305.00		3,975.93	
General Fund		98.35		73.27	
<b>UTILISED RESERVES</b>					
• Project Assets		1,001.85		934.42	
• Other Assets		20.26		24.30	
• Land and Building		623.22		404.39	
Project Fund		1,579.30		1,675.79	
<b>TOTAL</b>		<b>7,627.98</b>		<b>7,088.10</b>	
<b>APPLICATION OF FUNDS</b>					
<b>FIXED ASSETS</b>					
• Project Assets		1,001.85		934.42	
• Other Assets		20.26		24.30	
• Land and Buildings		623.22		404.39	

INVESTMENTS				
Corpus Investments		4,305.26		3,975.84
Other Investments		1,447.60		1,512.71
CURRENT ASSETS AND LIABILITIES				
Advances	18.38		15.45	
Other Current Assets	12.60		13.45	
Cash and Bank	205.29		209.43	
<b>Gross Current Assets</b>	<b>236.27</b>		<b>238.33</b>	
<b>Less: Current Liabilities</b>	<b>6.48</b>		<b>1.89</b>	
<b>Net Current Assets</b>		<b>229.79</b>		<b>236.44</b>
<b>TOTAL</b>		<b>7,627.98</b>		<b>7,088.10</b>

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH 2016				(INR IN LACS )	
PARTICULARS		31st March 2016		31st March 2015	
<b>INCOME</b>					
Project income		1,547.75		1,473.95	
Interest Income		48.34		34.86	
Other Income		3.73		5.58	
<b>TOTAL</b>		<b>1,599.82</b>		<b>1,514.39</b>	



EXPENDITURE				
Staff Cost and Welfare		945.37		835.50
Travel		117.84		156.97
Operating and Programme Expenses		510.25		520.13
Depreciation		15.60		18.10
<b>TOTAL</b>		<b>1,589.06</b>		<b>1,530.70</b>
<b>Surplus/Deficit</b>		<b>10.76</b>		<b>(16.31)</b>

RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED 31ST MARCH 2016 (INR IN LACS)				
PARTICULARS		31st March 2016		31st March 2015
<b>RECEIPTS</b>				
<b>Opening Balances</b>				
(Cash and Cash equivalents)		5,697.96		5,383.71
Project Grants		1,311.98		1,122.99
Corpus/Endowments		392.38		237.86
Interest and other income		480.67		516.79
<b>TOTAL</b>		<b>7,882.99</b>		<b>7,261.35</b>

PAYMENTS				
Fixed Assets			300.71	111.81
Staff Cost and Welfare		1,002.79		836.51
Travel		110.93		152.57
Operating and Programme Expenses		483.35	1,597.07	503.96
<b>Closing Balances</b>				
(Cash and Cash equivalents)			5,985.21	5,656.50
<b>TOTAL</b>			<b>7,882.99</b>	<b>7,261.35</b>

Ashoka Trust for Research in Ecology and the Environment (ATREE) is a research institution in the areas of biodiversity conservation and sustainable development. We focus on applied science through research, education and action that influence policy and practice on conservation of nature, management of natural resources, and sustainable development.

ATREE is recognized as a Scientific and Industrial Research Organisation by the Ministry of Science and Technology, Government of India.

ATREE is registered with the sub registrar, Bengaluru North Taluk as a Public Charitable Trust and with the ministry of home affairs, Government of India under section 6(1) of the Foreign Contribution (Regulation) Act 1976.

ATREE is registered as a wholly Charitable Trust under Section 12(A)(a) of the Indian Income Tax Act 1961 and donations to it are eligible for 175% / 100% tax exemption under Section 35(1)(ii) / Section 80GGA(2)(a) of the Indian Income Tax Act 1961.

## ATREE OFFICES

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### Agasthyamalai Community Conservation Centre (ACCC)

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### Male Mahadeshwara Hills Community Conservation Centre

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1. Harpooning is a traditional fishing method in the Vembanad lake, Kerala © Samson P Samuel
2. Spider from the genus Paraplectana from Mimi in Nagaland © Rohit M. George.
3. The majestic Gagganachukki falls in the MM Hills. © Roshmi Rekha Sharma



## Mission Statement

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.



Ashoka Trust for Research in Ecology and the Environment

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