

annual report
2011-2012



**Ashoka Trust for Research in
Ecology and the Environment**

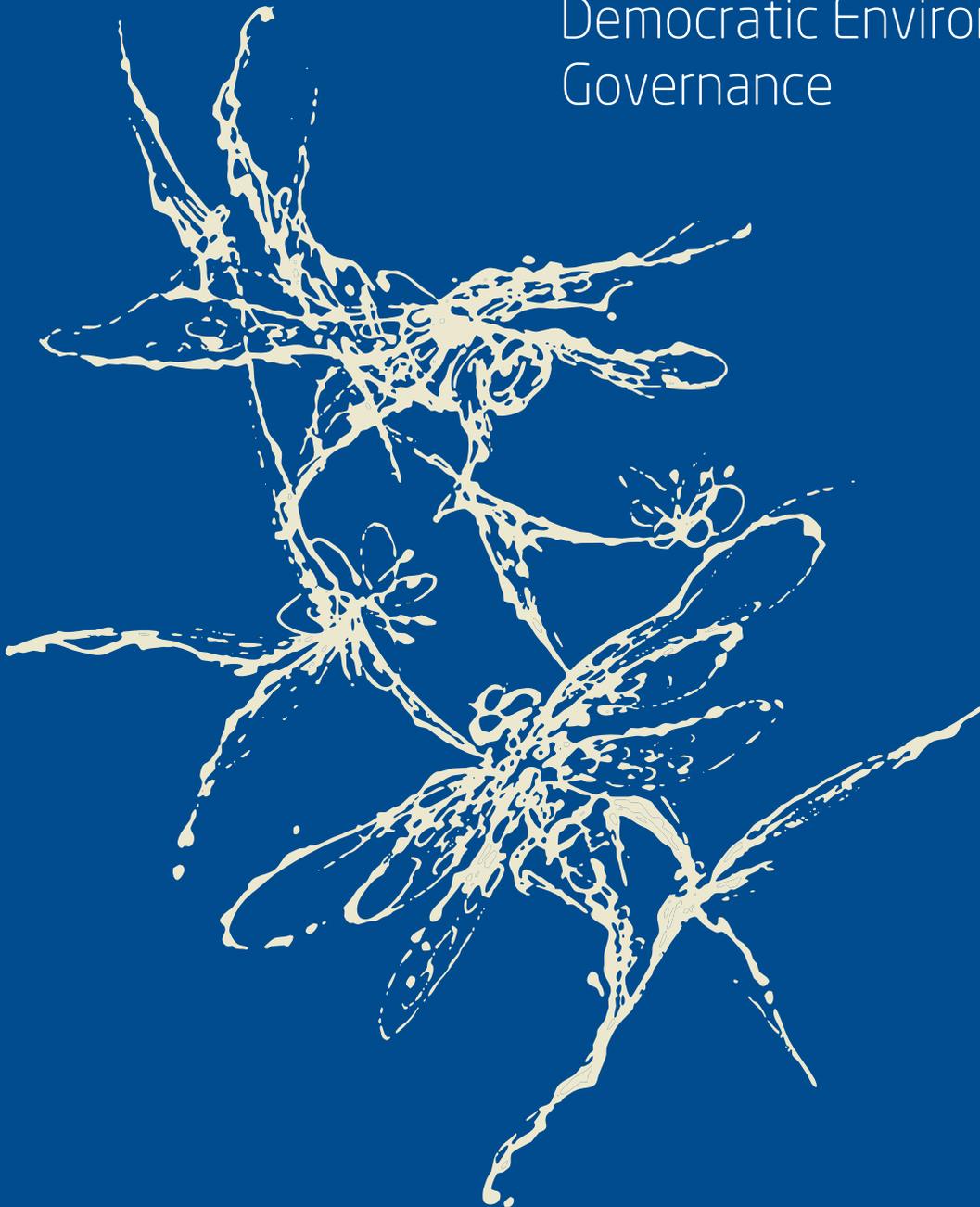
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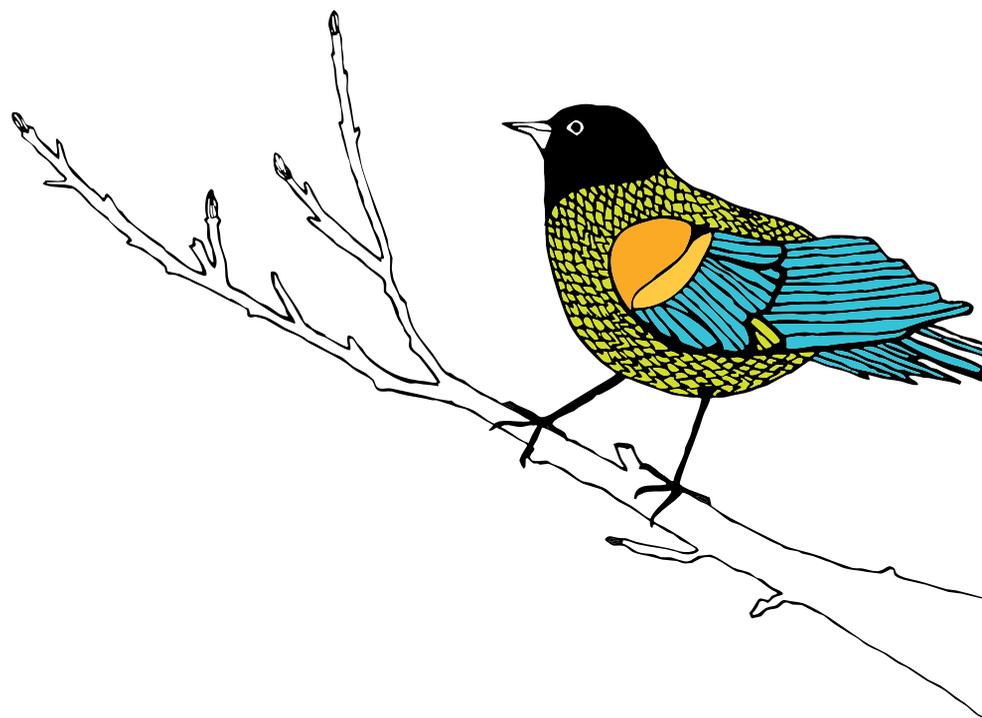
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Generating Knowledge for
Democratic Environmental
Governance





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success *and* leadership

A message from the President

This has been a good year for ATREE. As described in this report, ATREE faculty and staff passed many milestones in making new discoveries, generating new knowledge, and contributing to public policy. Not surprisingly, our work was recognized by others. A University of Pennsylvania study ranked ATREE #19 in the world and #1 in Asia among global environmental think tanks.

Leadership has played a critical role in ATREE's success. Dr Gladwin Joseph has led ATREE for more than 10 years with distinction, making ATREE one of the premier research centres in Asia. Gladwin facilitated the growth of ATREE from 3 faculty positions to the current number of 21. He developed the vision for ATREE's 6 community-based conservation centres, anchored the establishment of ATREE's Academy for Conservation and Sustainability Studies that currently enrolls 35 doctoral students, supervised the successful merger of the Centre for Interdisciplinary Studies in the Environment and Development (CISED) with ATREE,

and oversaw the construction and eventual move of ATREE staff to our new building. Gladwin also played a key role in sustaining India Biodiversity Portal, and the international journal *Conservation and Society* that ATREE hosts respectively on behalf of two different consortia. Although Gladwin will step down as the director, he will remain with ATREE in a leadership position.

In August 2012, Dr Ganesan Balachander will assume the role of new Director. ATREE again is very fortunate in securing the services of Dr Balachander. He was the Ford Foundation's South Asia Representative for six years until late 2008. Subsequently he was appointed Director of the Consortium Board of the Consultative Group of International Agricultural Research (CGIAR) where he serves as the Chair of its Science Programmes-Partnership Committee. Prior to joining the Ford Foundation, he was the Director for Asia Programmes at The Mountain Institute in Washington, D.C., managing large conservation projects. For a decade

from the early 1990s, he worked for a variety of organizations concerned with community-based environmental management and development in Asia and North America, including Biodiversity Conservation Network, a USAID-funded programme for promoting conservation of vulnerable ecosystems in Asia, for which he served as Director.

We face formidable challenges in environment and development. Dr Balachander will need his leadership skills to enable ATREE to meet these challenges. ATREE will also need continuing support from its many friends, including donors. ATREE is fortunate in having many supporters, but I would like to single out Sir Dorabji Tata and the Allied Trusts, Sehgal Family Foundation, Rohini Nilekani and Kumari Shibulal for their generous and unqualified support.

Kamaljit S. Bawa
President

*from the
director's
desk*



Dear friends and colleagues,

The challenges of a rapidly changing world where unsustainable development and lifestyles threaten the very ecology of life require urgent solutions that are essentially democratic, and fit all scales and contexts. There is a need for more cooperation and synergies between various actors and stakeholders while strengthening democratic governance. ATREE is committed to catalyzing the collective 'thinking' and 'doing' in effective and innovative ways to address these challenges that face us today.

ATREE researchers, while not teaching or engaging in policy dialogues, have been discovering new species and publishing in a variety of credible journals. This report captures the highlights of the year. We were elated that 39 sites across the Western Ghats (Agasthya-Sahayadris) were finally recognized as UNESCO World Natural Heritage sites putting these incredibly unique and rich areas on the global map. ATREE researchers provided technical knowledge and worked with the Wildlife Institute of India under the leadership of the Ministry of Environment and Forests to see this well-deserved honour for this part of India.

In 2011, the Academy for Conservation Science and Sustainability Studies recruited 16 PhD students. We implemented a redesigned course

structure and content and most of our faculty and students were consumed with course work for most of the year. We successfully launched a weekly ATREE public lecture series and had the privilege of learning from our own faculty's work, and also from visiting faculty from India and the world. Our students are talented, bright and have chosen a tough programme at ATREE. They have to take courses from various unfamiliar, but relevant disciplines as part of the interdisciplinary programme at ATREE. It is indeed a privilege to nurture and shape the future leaders in conservation and sustainability.

We have been preparing for a smooth transition in leadership at ATREE over most of the last year. I have decided to step down as Director starting 15 August, 2012 and focus more on my research and educational outreach interests. It has been a rich and meaningful journey with my colleagues at ATREE and all our well wishers and supporters. I am glad that together we have established a credible institution addressing the critical knowledge needs in the ecology, environment and sustainability space in India.

I am excited for the future of ATREE as Dr Ganesan Balachander steps down from the ATREE Governing Board and takes on the mantle of leadership as

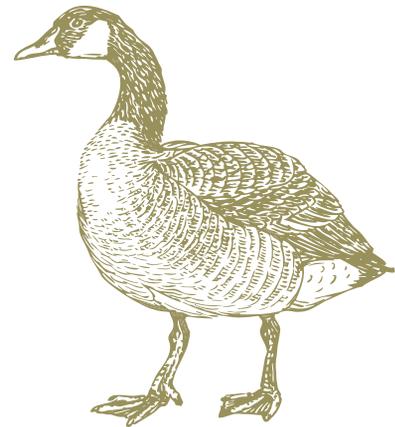
ATREE's new Director. He comes with exceptional talent and experience, and excellent leadership skills. Under his able leadership, coupled with highly committed 'second-to-none' colleagues at ATREE, it will grow from strength to strength as an innovative interdisciplinary research and educational institution.

The year ended for us at ATREE with the incredible news that our founder trustee and President, Dr Kamaljit Bawa, was selected for the world's first major international award for work on sustainability—the Gannerus Sustainability Award by the The Royal Norwegian Society of Sciences and Letters (DKNVS). He received this award for his pioneering work on population biology in rainforest areas, which directly enhanced the ability to conserve tropical forests. We vicariously share in the honour and celebrate with him.

With these few words I will sign off as Director. Please do continue to think deeply about our common sustainability problems and its solutions, but do not forget to thoughtfully act even in small ways. We need both hope and humility as we move ahead.

Gladwin Joseph
Director, ATREE
July 2012

important *recognitions*



In January 2012, a University of Pennsylvania survey ranked ATREE 19th among the top environmental think tanks in the world and, implicitly, the first in Asia.

The University of Pennsylvania's Go-To Think Tank' Rankings have been called the 'insider's guide to the global marketplace of ideas'. The Think Tanks and Civil Societies Programme of the University's International Relations Programme identifies think tanks by region and functionality. This year's ranking, based on peer and expert inputs, was the result of a 2011 survey of more than 1500 policy makers, scholars, journalists, current and former think tank executives, public and private donors, intergovernmental agencies and academic institutions from across the world. ATREE has been ranked 19th in the category of top think tanks by research area/ environment.

In April 2012, ATREE's founder and President, Dr Kamaljit Bawa, was selected for the world's first major international award for work on sustainability—the Gunnerus Sustainability Award by the The Royal Norwegian Society of Sciences and Letters (DKNVS).

The Gunnerus award is named after Bishop Johan Ernst Gunnerus (1718–1773), founder of the Royal Norwegian Society of Sciences and Letters (DKNVS), and Norway's first internationally acclaimed naturalist. The objective of the Gunnerus award is to encourage research that contributes to the conservation of biological diversity in the context of sustainable development. Dr Bawa received this award for his pioneering work on population biology in rainforest areas, which has directly enhanced our ability to conserve tropical forests. Dr Bawa has carried out his research in Central America, Western Ghats and the Himalayas.

The award is the result of collaboration among DKNVS, Sparebank1 SMN and the society Technoport. Professor Kristian Fossheim, President of DKNVS said, "We are very pleased to have selected such a worthy winner of the first Gunnerus award. DKNVS aims to make this a global prize of quality and importance worthy of comparison to the Nobel Prizes in science."

Dr Bawa joined some of the worlds' most influential artists, scientists, scholars, authors and leaders when he was inducted into the American Academy of Arts and Sciences in October 2011. Dr Bawa has been recognized in the area of public affairs, policy and journalism as an expert on sustainability issues. The American Academy of Arts and Sciences is a 230-year old institution of academic excellence with a current membership that includes more than 250 Nobel laureates and more than 60 Pulitzer Prize winners.

Research highlights



Suri Sehgal Centre for Biodiversity and Conservation

This centre aims to build a critical body of knowledge about India's biodiversity, ecosystem functions and ecosystem services of natural and managed ecosystems in the context of global, regional and local change. We believe that understanding the role of biodiversity and ecosystem functions in sustaining human welfare is crucial to galvanising conservation awareness and eliciting civil society support for conservation. Recognising the structure, function, and value of biodiversity will enable us to prioritise outreach activities and natural resource management initiatives.

Centre convenor: Jagdish Krishnaswamy

Ecosystems and global change

The goal of the programme on Ecosystems and Global Change is to fill critical knowledge gaps and to actively engage with civil society and government to better deal with the uncertainty associated with ecosystems under global change. It is organized under four working groups:

- ▶ Systematic Biology
- ▶ Monitoring and Habitat Management
- ▶ Conservation Planning and Society
- ▶ Ecosystems and Climate Change.

Primary faculty:

Abi Tamim Vanak, Ankila Hiremath and D. R. Priyadarsanan (Programme leaders),

Aravind N. A., G. Ravikanth, R. Ganesan, T. Ganesh

Secondary affiliations:

Jagdish Krishnaswamy, Nitin Rai, Siddhartha Krishnan, Shrinivas Badiger, Soubadra Devy

New to Science

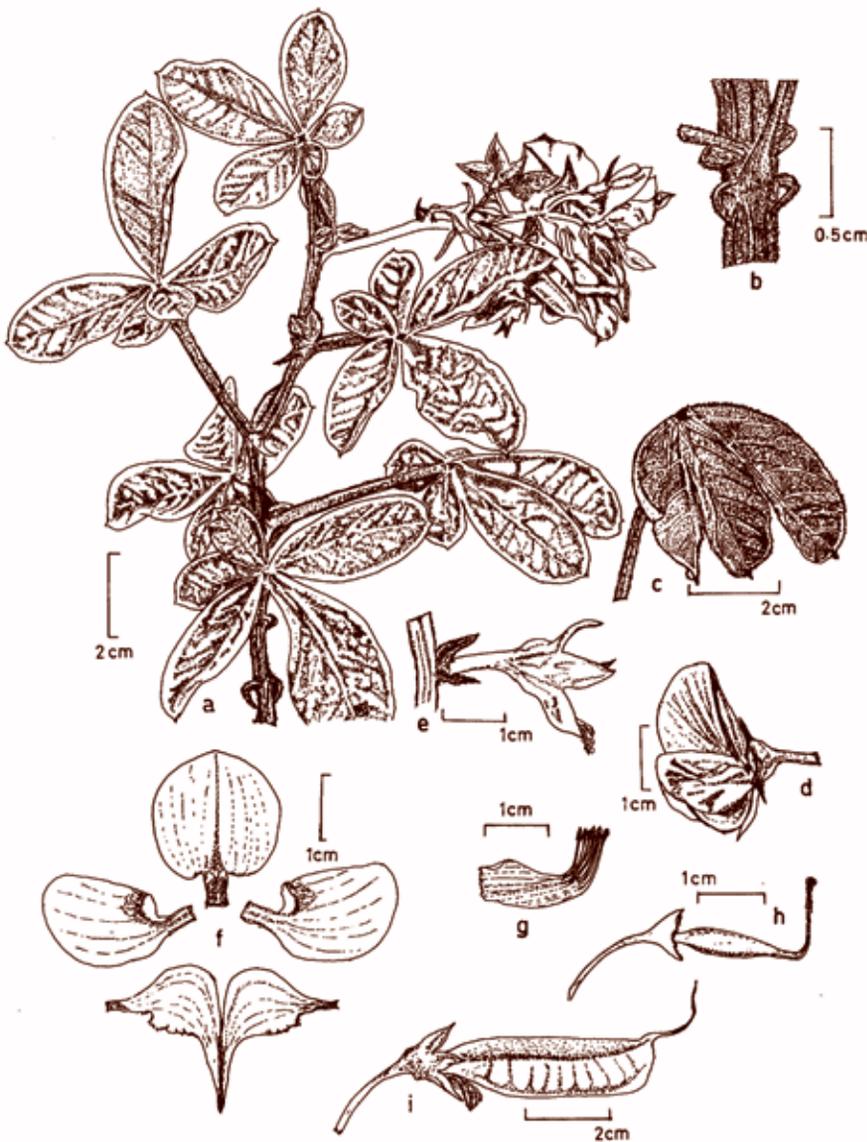
ATREE researchers describe new species of plants, snails, fish and amphibians from the Western Ghats

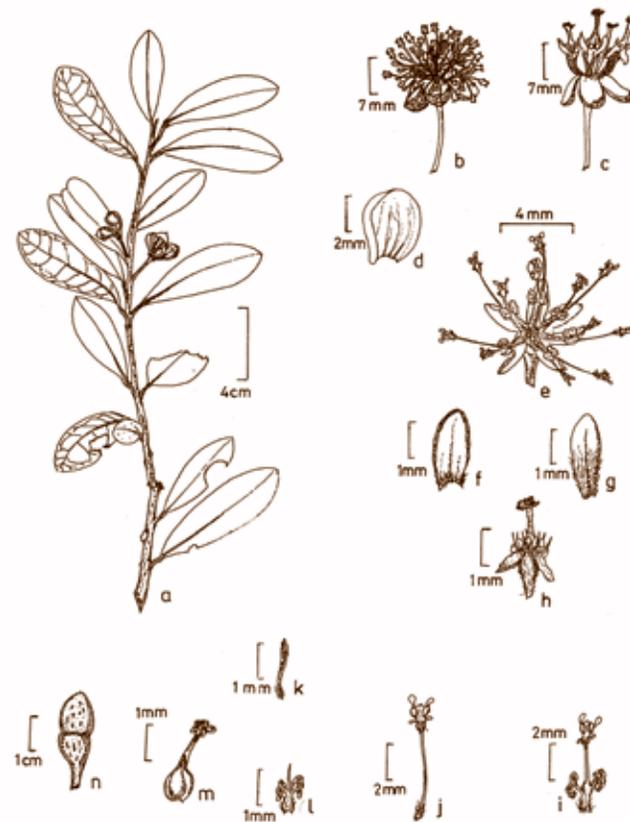
- ▶ A new species of Lauraceae has been described from Agasthyamalai hills, southern Western Ghats by R Ganesan, faculty at ATREE. The discovery was made after a population of *Litsea* sp. was located in one of the forest dynamics plots established to monitor

population dynamics of forest trees in wet evergreen forests at Kakkachi, Kalakad Mundanthurai Tiger Reserve (KMTR). Later, populations of this species were spotted in selectively logged forests in Kakkachi and Upper Kodayar.

Specimens collected from these populations were critically studied and compared with other described species from India and Sri Lanka and none of them matched this species. The only closely related species described from India is *Litsea venulosa*, an endemic species restricted to south of Nilgiris mountains, Western Ghats. Interestingly, this species was collected by the British botanist Captain R H Beddome from Courtallam and Singampatti forest (part of KMTR now) sometime before 1885 and deposited at the Natural History Museum (BM), London without being assigned a name. These unnamed collections stacked in the pigeon holes of the British Museum also confirmed Ganesan's assumption that the recent collection from KMTR forests is new to science.

This study highlights the importance of preserving as well as referring to old herbarium collections in practising systematics and understanding the distribution range of plant species. The population located in Kakkachi does not face any threat as it occurs within a tiger reserve. However, the population in Courtallam Reserve Forest is threatened as it is located adjacent to plantations. In terms of its abundance and threat status, it has been recommended that this new species be categorized as Near Threatened (NT), following 2001 IUCN Red List Categories and Criteria, especially given the threats to the Courtallam population.



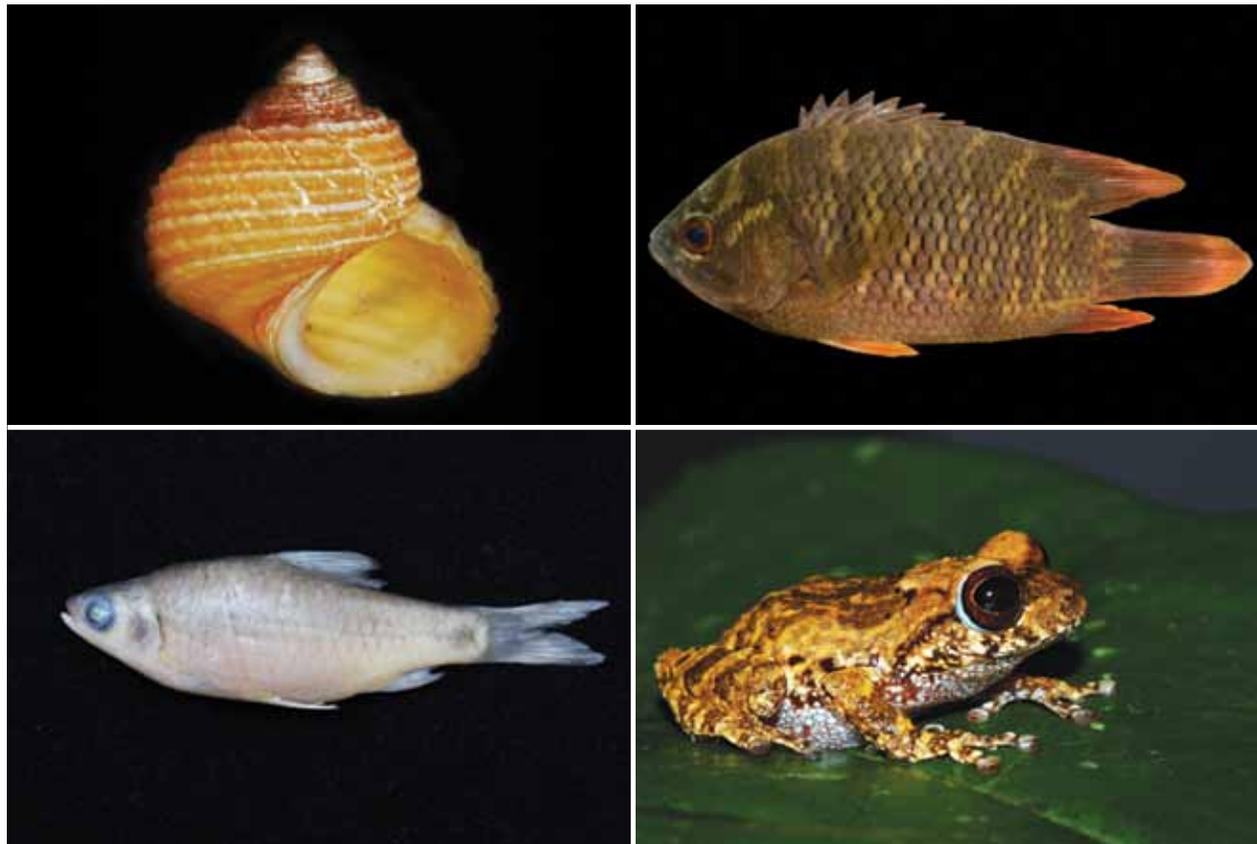


► Ganesan and Kottai Muthu (ex-Research Associate, ATREE) have reported the rediscovery of an endemic and rare plant species from Alagar Hills near Madurai in Tamil Nadu.

Crotalaria digitata was collected after 178 years from its type locality (location of its first collection). This discovery 'literally' brought back to life a species that had been considered 'extinct' in the botanical world. This rediscovery has also enabled a detailed description, with illustration and information about its habitat and threats, most importantly clearing the confusion on its distribution due to incorrect identification of a

few collections from Kodagu district, Karnataka. However, the researchers caution that the species is very rare, with only 10 large individuals and a few saplings found in the locality. These plants were found holding on precariously to soil in crevices of a rocky hillock, surrounded by cashew and mango plantations and dry farmlands. Following the IUCN guidelines to assess threat status, as well as personal observations, they suggest that the species be categorized as near extinction, due to its restricted distribution, very low population size and threats to its habitat.

► In late 2011, a team of researchers, including N A Aravind, faculty from ATREE, described six new species of snails of the genus *Cremnoconchus* from the central Western Ghats in Karnataka, more than 500 km south of the previously known range of the genus. The family Littorinidae is almost exclusively marine but a unique freshwater genus, *Cremnoconchus*, is known from India. Its members are restricted to montane streams on the western escarpment of the Western Ghats, at altitudes between 300 and 1400 m. Four species and several varieties were described in the nineteenth century, but no taxonomic



study has been carried out for over 120 years and the last anatomical report was in 1935. Nevertheless, they are of unusual evolutionary interest and also of conservation concern as a genus endemic to the Western Ghats biodiversity hotspot. Based on anatomical study of the newly collected material and examination of historical and type specimens, the researchers have presented a systematic revision of *Cremnoconchus*, illustrating shells, radulae and reproductive anatomy. In terms of their distribution, the species each appear to be restricted to a single drainage system and because of this highly restricted distribution and fragile habitat, the researchers judge this radiation of nine species to be endangered.

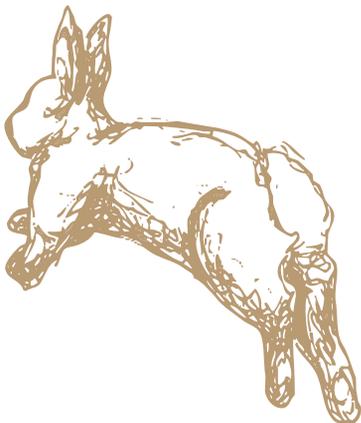
► In 2012, a team of researchers from ATREE, Natural History Museum, London and Conservation Research Group, St. Albert's College, Kochi reported the discovery of a new fish species named *Pristolepis rubripinnis*, occurring in the Pamba and Chalakudy rivers in Kerala. The genus *Pristolepis* comprises moderate-sized (15–20 cm) fishes with an interesting disjunct distribution, restricted to freshwater streams in southern India and most of Indochina and the Sunda Islands. Currently only four species of the genus *Pristolepis* are considered to be valid. Discoveries such as this show that our knowledge of the fishes of Western Ghats is still poor, and is in urgent need of extensive explorations and systematic taxonomic

research. The discovery of a second species of *Pristolepis* in the southern part of the Western Ghats comes 163 years after Thomas Jerdon described *Pristolepis marginatus* from the erstwhile Malabar. Currently, 189 species of endemic freshwater fishes have been reported from the Western Ghats and it is expected that the figure will continue to rise in coming years.

► A new species of barb was described from the Manimala River in Pathanamthitta district of Kerala in 2011. The discovery was made during a River Fish Monitoring Programme of the State Biodiversity Board, involving researchers led by K Krishnakumar from ATREE and researchers from St. Albert's

College, Kochi. The survey resulted in the collection of four specimens, which could not be readily assigned to any of the known species under the genus *Puntius*, following which a detailed analysis was done and the fish was described as a new species, *Puntius madhusoodani*. This genus has more than 140 species, comprising small to medium sized barbs found in stagnant pools to fast flowing streams of tropical Asia. Due to their attractive appearance they are popular as aquarium pets and are extensively traded. Currently, more than 60 species of the genus, *Puntius* are known from India, mainly from the Western and Eastern Ghats and Eastern Himalayas, including *Puntius denisonii*, popularly known as 'Miss Kerala'. The results have been published in *Biosystematica*.

- The Western Ghats harbours a high diversity of amphibians, particularly shrub frogs of the genus *Raorchestes*. In 2012, researchers, including Aravind and K S Seshadri from ATREE, reported a new species of *Raorchestes* from the mid-elevation evergreen forests of Kalakad Mundanthurai Tiger Reserve (KMTR) from the southern Western Ghats, India, taking the total number of *Raorchestes* species in the Western Ghats to 40.



Why are *amla* populations declining?

Guiding management interventions through a ten-year study of populations, harvesting and invasive species

Between 1999 and 2009, the number of *amla* trees fell to a tenth of what they used to be in the Biligiri Rangaswamy Temple Tiger Reserve (BRT). *Amla* here refers to two species: *Phyllanthus emblica* and *Phyllanthus indofischeri*. These are important trees locally for the indigenous Soliga community, as the harvested fruit is a source of cash income, and is marketable as an important ingredient in Indian traditional medicine. *P. emblica* prefers dry deciduous forest of high altitude; its cousin, *P. indofischeri*, is found in the low statured scrub jungle restricted to lower elevations of BRT. *P. indofischeri* is endemic to the Deccan plateau; therefore, its decline is of particular concern. In 2006, the collection of *amla* fruits was banned in BRT as part of the blanket ban on NTFP collection under the Wildlife Protection Act. However, the downward trend in the number of *amla* tree continued. Clearly, the focus on fruit harvest as the cause for *amla* tree decline was misplaced. As conservation policies and management intervention follow from causes known, identifying the right drivers for this decline was imperative.

Researchers at ATREE and University of Hawaii have produced a time warp study for the period between 1999 and 2009 to track the effects of two invasives, *Lantana camara*—an alien shrub, and *Taxillus tomentosus*—a mistletoe that parasitizes the tree; as well as fruit harvest, on the demographics of *amla* populations for that period. Monitoring plots were laid and surveyed every year from 1999 for individual tree (seedling, sapling, juvenile and adult) count, growth, and the number of fruit per tree—in

November before the fruit matured, and post fruit harvest. It was possible to isolate the individual and combined effects of each driver—*lantana* and mistletoe—using appropriate mathematical models for analysis as they affect the tree at different stages of its growth. Mistletoes affect the vital rates of adults, and *lantana* affects seedlings and saplings. As counting individuals does not provide information on the nature and likely trend of population change, the study looked at vital rates—fecundity, recruitment, survival and mortality—to gain an understanding of composition and structure of *amla* populations.

In the plots established in the scrub forest to monitor *P. indofischeri*, invasives took longer to establish. In 1999 there was little or no *lantana* or mistletoe across all plots. By 2005 four *P. emblica* plots were highly infested with *lantana* and mistletoe; one plot was completely infested with *lantana*. The *P. indofischeri* plots showed moderate mistletoe infestation till 2006, and *lantana* crept in by 2008, but was still thinly spread.

Results have shown mistletoe as negatively affecting the population and population growth rate of both the species by increasing adult mortality. *Lantana* has had direct and indirect negative effects: aggressive *lantana* spread corresponded with low growth of *P. emblica* seedlings and saplings across all treatments, resulting in depressed population growth even before mistletoe invasion. The density and cover of *lantana* increased considerably over the ten-year period. *Lantana*, being unpalatable to wild ungulates, drives browsing grazers to *lantana*-free areas, affecting seedling recruitment and population growth rates of *amla* (and other species) in *lantana*-free areas as well. This oblique effect of *lantana* spread was not anticipated.

The Soligas harvested fruits from trees with high fruit crops only. Fruit harvest varied from 20 to 88 per cent of fruit produced: peaking when fruit production was high and falling when low. The average for *P. emblica* was 55–65 per cent of fruit produced. Fruit harvest is assumed to be the principle cause of *amla* decline, but this research suggests that harvest has little impact on population dynamics of *amla* in this scenario of invasives and mistletoe infestation. Therefore, to effectively stop *amla* population decline, mistletoe and lantana management should be prioritized as part of biodiversity conservation activities at BRT.

The findings show that it is important to correctly identify causes of disturbances on plant species at risk to develop effective plans for their conservation. This is the first study to indicate that lantana indirectly limits recruitment in lantana-free areas, not just of *amla*, but also possibly of other Indian dry forest tree species palatable to ungulates. This is also the first study to track mistletoe impacts on host species population dynamics in the long term.

Do we need a barcode of life?

Given the scale of the investments required and doubts regarding validity of the technique

Till date, morphology has been widely used to catalogue more than 1.7 million species on earth. However, relying on morphology alone has its problems. One, to distinguish closely related and cryptic species, one would need a specialized taxonomist, a rare commodity these days. Besides, several taxonomists are needed for each biodiversity survey. Two, vegetative parts or seeds in the case of plants, and eggs and juveniles in the case of animals, which are often more abundantly available, may have



no distinguishing features at all. Three, it is impossible to identify damaged specimens or those with only certain parts available.

This is where DNA barcoding comes in – as a quick, cheap and easy method of identification. To scientists who have long struggled with uncertainties in identifying and classifying species, the concept of a universal DNA sequence or barcode to distinguish between species has been one of the more exciting ideas in the history of taxonomy and systematics.

However, in the short history of taxonomy using an organism's genetic makeup, questions regarding technique and the philosophy of barcoding have begun to crop up. One of the larger possibilities of barcoding research was a global genetic library of all biodiversity, which could overlap and nudge current taxonomic classifications towards accuracy and greater certainty. However, with the limitations in DNA barcoding, the drive to barcode for a global dataset is facing serious obstacles.

In a paper titled 'In pursuit of a universal barcode of plants: peril of followers?' in *Current Science*, G Ravikanth *et al* wonder if the scaffolding of past work on genetic barcoding is strong enough to build on; and, whether scientists and institutions should continue to invest resources on barcoding projects. They also ask whether there is merit in pursuing genetic barcoding in India, given the scale of the investments it requires, and doubts regarding validity of the technique.

Identifying a universal DNA barcode requires locating a set of base pair sequences in DNA present in all taxa that show distinct variation between species, but not within species, and so can be relied upon to identify species by their DNA sequence, or barcode, alone. The challenge is that the barcode has to be derived from the makeup of the organism. Whereas scientists have managed to locate such a sequence in most of the animal kingdom, they have also realised that barcoding as a sure fire way of discriminating species is not infallible. In particular, locating

such universal sequence for plants has been particularly confounding. Although scientists need to test several regions within the DNA (gene segments) that might serve as a barcode for all plant life, the application of such research in the current scenario might be limited.

For India, the authors advise: ‘...we should ask ourselves “why are we barcoding?” We might be doing this as a member-state of the Consortium for the Barcode of Life (CBOL) and therefore to contribute the DNA barcode of our taxa to the global dataset. Second, we might wish to have a DNA barcode of the country’s taxa, so as to have unique identifier of our taxa that might find potential application in academic studies, conservation, commerce, etc.’ They suggest that future directions and strategies would follow from the objectives that the scientists align themselves to—building a directory of universal barcodes, or dressing down the rigour to develop a proxy that addresses immediate applications that complement conventional taxonomic studies, or in securing Intellectual Property Rights for economically important species. Viewed from this context, it will be important for the country to develop skills and infrastructure to undertake barcoding of at least some of the important taxa, both for conservation and commerce.

Phyllanthus admixtures in the herbal drug trade

Taxonomic incongruities, species adulteration and use of DNA barcoding

The trade in *Phyllanthus* species in India is mired in two problems: taxonomic confusion among closely related species, and species in trade sharing a common vernacular name. As a result, it is not uncommon to find

substantial admixture of species in trade samples.

A case in point is *Phyllanthus amarus*, used in the treatment of jaundice and known for its liver-protective qualities. Although *P. amarus* is a predominant species in trade, it is often found mixed with several other *Phyllanthus* species, including *P. fraternus* and *P. maderaspatensis*.

Admixture of species may have significant implications on the quality and efficacy of the eventual phytomedicine made from these mixtures. Studies have shown significant differences in the metabolite profile between *P. fraternus* and *P. maderaspatensis*, both occurring as admixtures in *P. amarus* trade samples. *P. amarus* was the only species found to contain phyllanthin







and hypophyllanthin, the two major compounds believed to be responsible for the hepatoprotective activity. The admixtures of different species could lead to diluting the efficacy of the herbal drug.

Using morphotaxonomical keys and molecular techniques, researchers at ATREE and GKVK analyzed *Phyllanthus* raw herbal samples from 25 different shops in three southern Indian states (Kerala, Tamil Nadu, and Karnataka). The samples showed the presence of six different species of *Phyllanthus* (*P. amarus*, *P. debilis*, *P. fraternus*, *P. urinaria*, *P. maderaspatensis*, and *P. kozhikodanus*). Of the shops, 76 per cent had *P. amarus* as the predominant species. The identity of the species was confirmed using species-specific DNA bar codes developed using the chloroplast psbA-trnH. These bar codes could be used as a diagnostic key to authenticate *Phyllanthus* species in trade as well as to identify admixture of species.

Restoration of biodiversity in abandoned tea plantations

Conservation and livelihood possibilities in a time of abandonment and labour distress

India is the second largest producer of tea in the world and contributes 21 per cent of the global tea production. Much of this tea comes from the two mainland 'biodiversity hotspots' in the country—the Eastern Himalayas in northeast India and the Western Ghats in peninsular India. Due to market fluctuations, increasing costs of production and lease expiry, many coffee, tea and cardamom plantations have become unviable for active management, resulting in abandonment of the plantation and labour distress.

In Thiruvananthapuram division of Kerala alone, 536 ha (55 per cent) of the total 969 ha of planted area was abandoned. This has important consequences for biodiversity conservation and livelihoods.

The rather sudden and potential release of land due to plantation abandonment after decades or centuries of use has understandably led to a serious debate among the State Forest Departments and conservationists on the policies for future land use in plantations. ATREE researchers have looked at the restoration possibilities on these abandoned plantations, suggesting solutions for local livelihoods as well as for ecological stability of these landscapes. The team looked at several tea plantations in southern Kerala, such as Rosemala, Kallar in the Shendurni Wildlife Sanctuary, Bonacaud on the fringes of the Peppara Wildlife Sanctuary, and Ponmudi in Kalakad Mundanthurai Tiger Reserve in Tamil Nadu.

When plantations are abandoned they are biodiversity-poor, susceptible to invasion by exotic species and economically not useful. But given the location of the plantations, they have a high potential for harbouring and facilitating biodiversity to exist in the landscape. Conservation schemes in and near large tea plantations also face unique livelihood challenges that arise from the fact that plantation workers have become accustomed to these mountain environments.

Tea habitats per se are poor in biodiversity, unlike coffee and cardamom, which have native or exotic species tree cover, but tea plantations facilitate movement of wildlife. Abandoned plantations offer excellent opportunities to restore various forms of native biodiversity, but considerable effort from the landowners and the

forest department is needed to restore the land to harbour native flora and fauna.

In a separate study ATREE researchers have shown that this can be done. Tea plantations with planted shade trees are important for native species to colonize through frugivore activity. When this is combined with active dispersal of seeds based on the life-history traits of the plant species, one can draw up a comprehensive protocol for ecological restoration of native forests.

Conservation and livelihood challenges are formidable in geographies where plantations and Protected Areas coincide. In the Thiruvananthapuram division, plantation workers are struggling to find alternative livelihood sources after the plantations were abandoned. Many families work as casual labourers in road construction schemes, or in some cases like in Bonacadu, the workers themselves pluck the tea leaves and sell it to middlemen at low prices.

The study makes a set of recommendations on how restoration can be taken up, using the government's flagship National Rural Employment Guarantee Act (NREGA) and using the space offered by the Ecologically Fragile Land (EFL) Act where it is applicable. The restored landscape can be opened up for ecotourism that could generate revenue to offset the losses.

Ecosystem Services and Human Wellbeing

The objectives of the Ecosystem Services and Human Wellbeing Programme are to explore the role of ecosystem services in local land use planning and decision making, develop a better understanding

of the socio-ecological and economic importance of ecosystem services and their role in promoting equity and environmental justice, and facilitate political and societal support for maintaining and enhancing ecosystem services.

Primary faculty:

Jagdish Krishnaswamy (Programme leader), Siddhartha Krishnan, Soubadra Devy

Secondary affiliations:

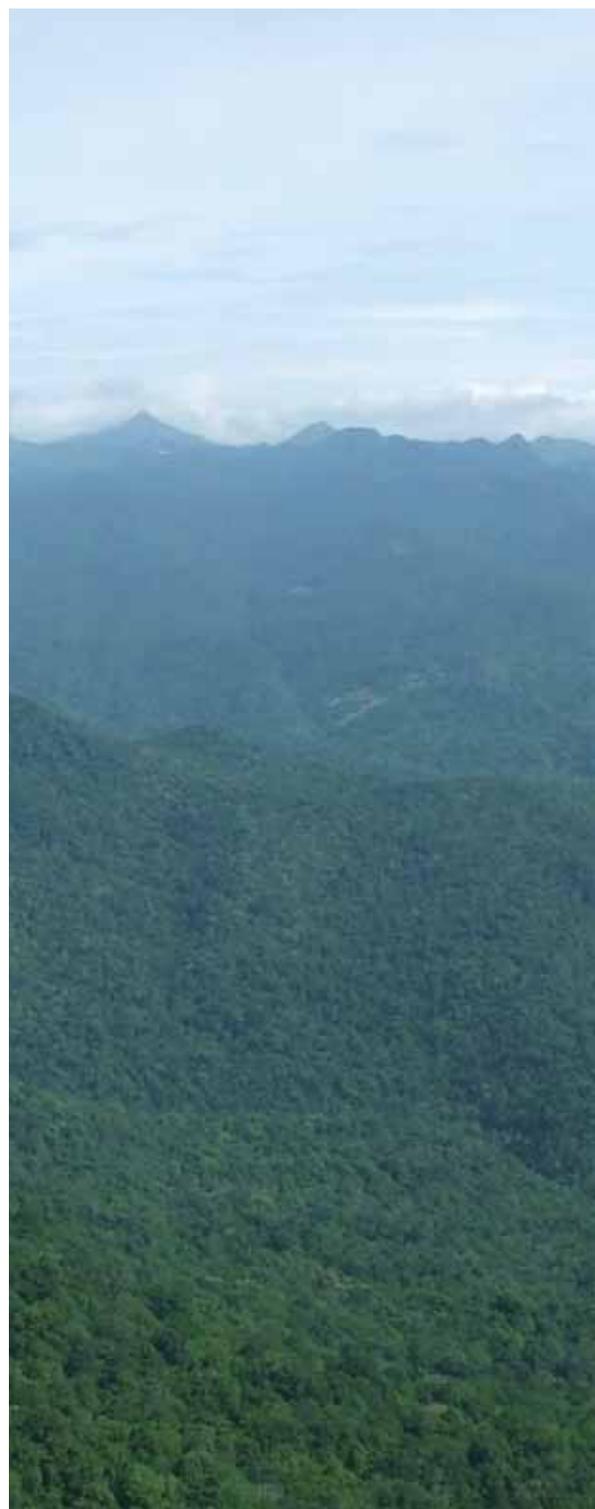
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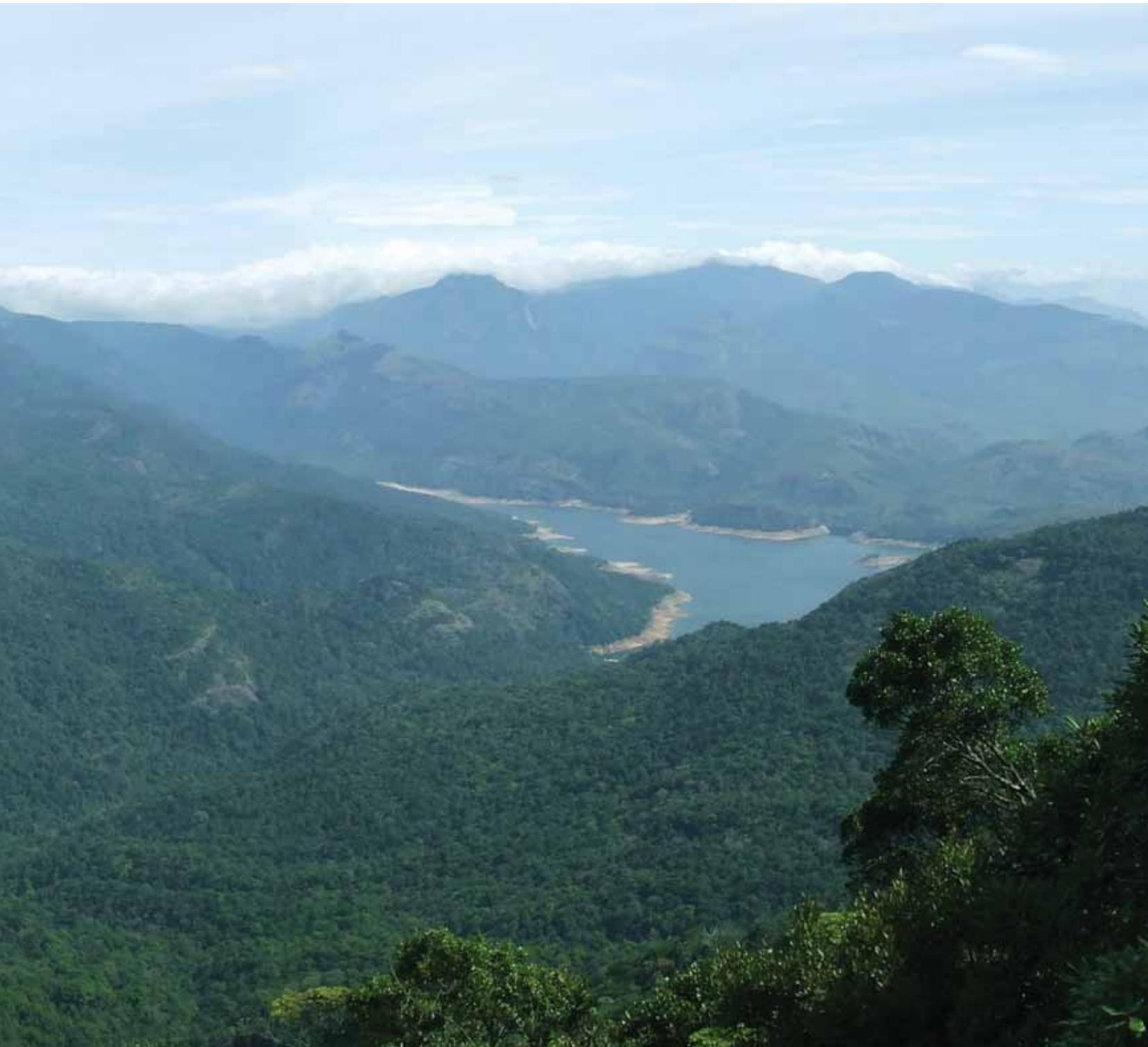
Forests, plantations and rain run-off response

Exploring catchment dynamics of afforestation–reforestation in the Western Ghats

ATREE researchers, led by Jagdish Krishnaswamy, and fellow researchers from the National Institute of Hydrology, the University of Dundee, Scotland and TERI, Goa have published findings from a forest hydrology research project in Uttara Kannada district of the Western Ghats, investigating the impacts of afforestation–reforestation of degraded land on hydrology, particularly surface flows.

The study looked at effects of forest degradation and use and establishment of tree plantations on degraded or modified forest ecosystems at multi-decadal time-scales using tree plantations on the streamflow response. It used for reference a previous soil hydraulic conductivity survey, linked with rain IDF (intensity–duration–frequency) that had suggested a greater occurrence of infiltration-excess over land and higher streamflow within





degraded forest and reforested areas. These predictions were tested by establishing experimental basins ranging from 7 to 23 hectares across three ecosystems—remnant tropical evergreen forest, heavily used former evergreen forest converted to tree savanna, and exotic acacia plantations on degraded former forest land. Eleven basins were instrumented in two geomorphological zones and rainfall–streamflow observations were collected (daily, and at 36 min time resolutions in the coastal basins) from 2003 to 2005.

The findings support conclusions from the earlier hydraulic conductivity survey which suggested that occurrence of overland flows may have increased as a result of long-term forest degradation. Such findings also apply to reforested, degraded land now planted with acacia. It also shows enhanced total stream discharge and quickflow, both seasonally and by storm event, when compared to the less disturbed, baseline evergreen forest. Conversely base (delayed) flow is reduced. Acacia plantations may thus not be very effective in restoring hydrologic functions in the short-term.

Interestingly, the results also show evidence of contributions from deeper, sub-surface sources to the storm hydrograph (more associated with baseline evergreen forest) still continuing under the degraded forest and acacia plantations. This is partly attributed to the sub-soils being comparatively permeable when compared to other studies. It also suggests that despite some recovery in the surface hydraulic conductivity, the rain-streamflow response characteristics of acacia plantations still retain a 'memory' of the storm hydrograph characteristics described above for the degraded forest. As potential and actual evapotranspiration is likely to be depressed during the monsoon, differences in streamflow and

run-off responses between land-cover are largely attributed to differences in soil infiltration and hydrologic pathways.

The study makes the point that hydrologic functions and services should be viewed in a larger frame-work of multiple ecosystem services and biodiversity of these ecosystems, and that land management options to increase infiltration should be explored within this context of trade-offs and synergies at various spatial and temporal scales.

Pollinators and pollination services

Pollination plays a critical role in sexual reproduction of flowering plants and is a prerequisite for fruit and seed development. Pollination limitation often threatens the sustainability of many wild species. Although India is rich in biodiversity, we do not have baseline data on reproductive ecology in general, and pollination in particular, on most of our wild species. Such data is essential for effective conservation and sustainable utilization of our plant resources. One of the programmes of ATREE has been to generate such baseline data on our endangered, endemic and economically important species.

In a paper published this year, researchers at ATREE have looked at the pollinator assemblage in *Myristica dactyloides*, a dioecious tree species occupying the intermediate canopy stratum of the mid- and high-elevation wet evergreen forests and endemic to Sri Lanka and the Western Ghats of India. Whereas Myristicaceae members from other tropical areas have been reported to be specialized to beetle pollination, observations from this study showed evidence of a generalist pollination system in *M. dactyloides*, composed of small, diverse insects, including

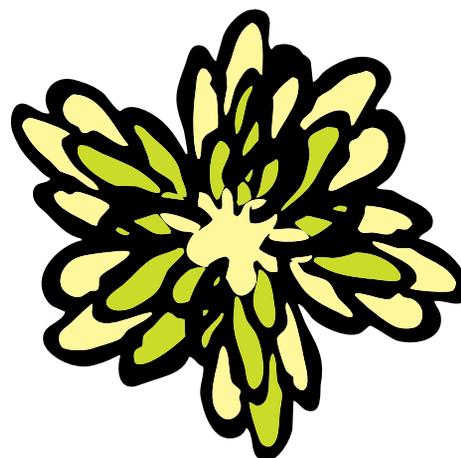
thysanopterans (thrips), coleopterans (beetles), halictid bees and dipterans (syrphid and phorid flies).

The results from pollination biology studies of large cardamom, carried out in the Darjeeling and Sikkim Himalayas, published in 2011, have established bumblebees as the major pollinator. It also identified other pollinators and their visitation frequency in plantations at various elevations. The studies clearly showed that maintaining honeybee colonies on cardamom plantations does not help in improving pollination and that pollination efficiency can only be improved by increasing the population of bumblebees through better habitat management.

A separate ongoing study is looking at the role of forest patches in provisioning ecosystem services in a landscape matrix of forest fragments and farms in West Sikkim, focusing on pollination studies of an important cash crop, the Sikkim Mandarin orange. The study is looking at whether demonstration of pollinator services from the forest patches can help sustain these forests outside the Protected Area network. In another ongoing programme, led by Prof K R Shivanna, the focus has been on reproductive ecology of several endemic species of *Syzygium*, on which there is hardly any information.



Research highlights



Centre for Environment and Development

Human use of earth's natural resources is placing unmatched pressure on the capacities of local and global ecosystems. In South Asia, the subsistence needs of a large rural population and the demands of a growing industrial sector and consumer class on forests, water resources and agricultural lands are generating both resource degradation and conflict. At the same time, the conventional development paradigm of rapid industrialisation and urbanisation, supposedly leading to poverty alleviation, is generating air, water and solid waste pollution and affecting human lives and ecosystem health at multiple scales.

The brunt of both resource degradation and pollution is most heavily felt by the urban

and rural poor. How the process of development— economic, technological, socio-cultural and political—can lead to sustainable and equitable use of natural resources and containment of the pollution burden, and how sustainable resource management can contribute to poverty alleviation and human wellbeing are the broad questions that drive the work of the Centre for Environment and Development.

Centre convenor: Sharachchandra Lele

Forests and Governance

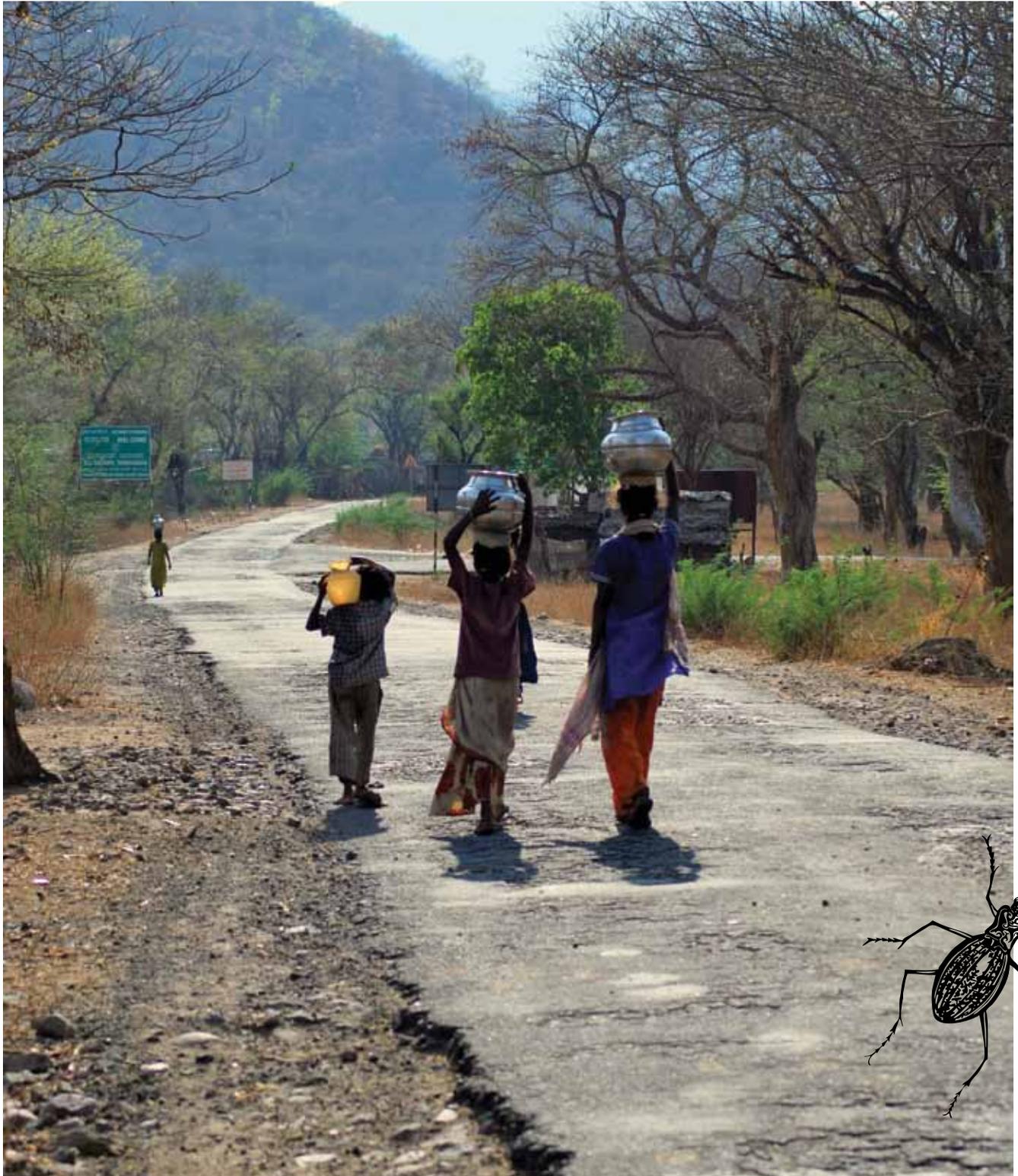
The goal of the Forests and Governance Programme is to understand what combinations of governance regimes, economic policies, cultural changes and biophysical measures will lead to better forest governance in south Asia.

This means more sustainable, equitable and livelihood-enhancing outcomes, and strong democratic processes. The focus is on rights, institutions and governance mechanisms, ecological and sustainable use of natural resources, and economic and cultural dependence.

Primary faculty: Ashokankur Datta (*till October 2011*), Nitin Rai, Sharachchandra Lele (Programme leader), Siddappa Setty, Swati Shresth

The future of forest governance

The Forests and Governance programme has been engaging with the question of democratic, decentralized forest governance at several levels: through helping communities claim rights under the Forest Rights Act (FRA), researching the implications of de facto community management for the distribution of forest benefits, and helping



re-conceptualize forest governance in ways that better reconcile local concerns with those of off-site stakeholders.

In terms of implementation of FRA, the last year has been a major step forward. On 2nd October 2011, three years after starting the process for getting community rights, the district administration of Chamarajanagara distributed Community Forest Rights to 25 Gram Sabhas of BRT and adjoining areas, giving communities rights to access and market forest produce like *nellikai*, honey, lichen, collect firewood, fish in BRT water bodies, and graze livestock. BRT has thus become the first place in Karnataka where community forest rights have been granted in a Wildlife Sanctuary. Forest and Governance researchers are now working with the Soliga community to develop alternative management plans for these community forest resources that will be compatible with the Tiger Reserve status given to BRT, while facilitating the exercise of rights given under FRA. A first workshop was held in June 2011 in anticipation of receiving the community grants, wherein Soligas proposed an alternative community-based management regime with a three-tier hierarchy starting from a *podu* (hamlet) level, to taluka and sanctuary level, which would address their needs, as well as of tiger conservation. The workshop was organized by ATREE and its partners, Vivekananda Girijana Kalayana Kendra (VGKK), Kalpavriksh and Zilla Budakattu Girijana Abivrudhhi Sangha (ZBGAS).

In 2011, ATREE, along with University of East Anglia and Vasundhara started work on an Ecosystem Services for Poverty Alleviation (ESPA) project in Nayagarh district of Odisha to understand the links between forest governance, forest ecosystem services and human wellbeing, especially of the poor who

live on the fringes of forests. The team aims to understand how the magnitude and distribution of benefits from forest ecosystems to multiple stakeholders at different scales differ under different governance regimes, namely, Protected Areas, Reserve Forests and community managed forests. ATREE is studying select ecosystem services: firewood, grazing and non-timber forest products, hydrology, carbon sequestration, and biodiversity, as well as disservices like crop damage and human-wildlife conflicts. Preliminary results indicate high levels of biodiversity in community managed forests, and significant variation in who gets the benefits, depending upon the history and internal relationships between the communities.

While ATREE researchers contributed to the recommendations made by the Forest Rights Act Committee in December 2010, a more elaborate set of recommendations has now been formulated:

- ▶ Rights should be vested with hamlet level bodies to ensure bottom-up governance, not Gram Panchayat/ Gram Sabhas as these are too large and heterogeneous.
- ▶ Removal of barriers to NTFP-based livelihoods, including earlier legislation that nationalized valuable NTFPs, such as *tendu* (*Diospyros melanoxylon*) leaves and bamboo.
- ▶ The state should extend price and marketing support programmes for the sale of NTFPs, technical support for community forestry, and policing support to counter external timber and land mafia.
- ▶ Monitoring and regulation of the community forestry institutions must be by the forest departments, in a transparent manner, and under the supervision of regulatory bodies at the district-level.

▶ **Communities should have veto powers in conversion of forests to non-forest use under the Forest Conservation Act.**

A multi-layered, democratic governance structure will ensure that one stakeholder will not decide what is best for the forest and for its beneficiaries. Helping move towards such a system and exploring the implications of various options under different socio-ecological conditions will continue to be the goal of the Forest and Governance programme.

Centralized policies and livelihoods of forest-dependent communities

ATREE researchers studied the role of centralised forest policies on the livelihoods of forest-dependent communities at Malai Mahadeshwara (MM) Hills, in this case Soligas and Lingayaths. Contributions to income have typically been from non-timber forest produce (NTFP), bamboo basket weaving, and rain-fed agriculture for households with land holdings. In a study that analysed income data from 2000 to 2010, researchers found that per capita income from agriculture fell by 70%, and per capita income from forest produce decreased by 80% over the same period, but overall income showed a rise of 5–20% for Soligas and Lingayaths respectively. This net increase in income was accounted for by contributions from wage labour, which involves seasonal outmigration to coffee plantations and stone quarries away from MM Hills.

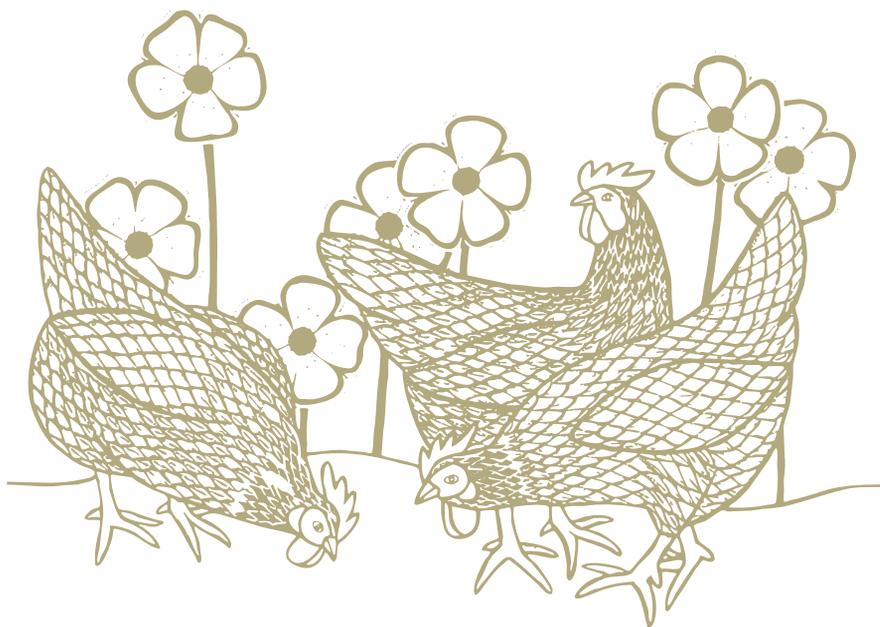
The questions asked were: How have forest policies affected the livelihoods and wellbeing of forest-dependent communities? How have indigenous communities coped with loss of rights over and access to forest resources and loss of avenues to market forest

produce? How might forest users benefit from recent devolutionary policies? Over the years, the pattern that emerges is of implacable closure of locally available options, till finally, the only option for earning a living was outside of MM Hills.

Agriculture produce supports Soliga and Lingayath households for less than six months of the year. Farmers reported reduction in per capita cultivable land, variable rainfall, and escalating input costs as reasons for outmigration in search of labour rather than farming their own land. The Public Distribution System (PDS) supplies rice, sugar and wheat at subsidised prices. This has provided for the communities during the lean years in agriculture and when there are restrictions on collecting wild vegetables and fruits, but has also enabled them to consider work options in distant areas.

There is high dependence on NTFPs like fuelwood, bamboo, fruits and leafy vegetables throughout the year for subsistence use as well as for cash income. Under the Indian Forest Act, the Wildlife Protection Act of India, and later, the notification of the Cauvery Wildlife Sanctuary, there have been restrictions in access to fuelwood and bamboo. The current system of NTFP marketing requires a contractor, to whom the Forest Department offers the contract for NTFP trade for a fixed period of time. In MM Hills, two or three contractors have monopolised the lease for over two decades, resulting in collectors not getting even market prices. Unprocessed NTFP like *amla* is sold in the market at ten times the price paid to the community who serve merely as labour to collect forest fruits.

The study shows that reduced income from NTFPs and lack of access to agricultural inputs have encouraged the migration of forest dwellers. Such a



creation of a labour class is reflected in many rural areas of India despite state schemes such as PDS, health care and education.

Also see section on lantana use to create livelihoods in MM Hills in our capacity building section on page 34.

Land, water and livelihoods

The goal of this programme is to understand the trends in and drivers of change in land and water-stressed regions, and urban-rural interfaces with respect to water availability, water quality, land degradation, food security and provisioning of environmental services by agricultural systems. It seeks to identify appropriate practical and policy strategies that promote environmental sustainability and human wellbeing.

Primary faculty: Bejoy K. Thomas, Priyanka Jamwal, Seema Purushothaman, Shrinivas Badiger (Programme leader), Sumit Sen

Secondary affiliations: Sharachchandra Lele

Factoring the future into farming

Can expectations of environmental and economic sustainability coexist?

The World Commission on Environment and Development (1987) defined sustainable development as 'development that meets the needs of the present without compromising the needs of the future'. Given the current relevance of this definition, the 'Land, Water and Livelihoods' team examined whether our notions of efficiency, productivity and profits, as applied to agriculture in rural India, were compatible with our visions of a healthy



planet and economy in the long term. Can expectations of environmental and economic sustainability coexist?

A set of interrelated studies on agrarian issues in India in general, and Karnataka in particular, looked at how selective scaling up of inputs might affect future viability of agro-ecosystems and livelihoods. Taking into consideration

the current and growing agrarian crisis in Karnataka, the team also explored the linkages among policies, land use, cropping patterns and sustainability of small-scale agriculture.

Agrarian policies in general do not factor local land use preferences, watershed development schemes and food security of the farm household. Therefore small-

scale farmers were more exposed to financial risks, were more vulnerable to uncertainties of weather and market, and lacked safety nets of even subsistence agriculture for food security, local seeds and manure.

ATREE researchers developed a framework for analysis that enabled a view of identified policies and agrarian distress in tandem, using indicators of impact on small-scale agriculture. Indicators that represent the multiple dimensions of small-scale farm sustainability were identified. Typically, ecological unsustainability in agriculture is measured in declining soil health, depleting water resources and dwindling agro-biodiversity, whereas economic unsustainability leading to agrarian distress is depicted by the aggregate of adverse terms of trade, conversion of agricultural lands, volatile prices and indebtedness. The cultural and social fallouts, on the other hand, are manifested in migrations, erosion of social institutions among rural communities, acute income disparity and diminished capacity to deal with changes.

In addition, the researchers also conducted a multi-dimensional impact assessment to determine which farming practice (chemically intensive or default organic) might be economically, socially and environmentally desirable at the local scale. They selected the Karnataka State Policy on Organic Farming (KSPOF, 2006) and analysed its outcomes at the farm level across contrasting districts in Karnataka. The analysis revealed that promoting *in-situ* generation of inputs along with strengthening institutions around organic practices can help small farmers in particular. The findings also suggest that (policy-supported) organic farming is more efficient than intensive farming, as it enhances ecological viability without compromising economic



feasibility, taking into consideration regional conditions and the rotations of crops cultivated. Notably, the tools and techniques used in the study may be replicated to assess environmental, economic and social sustainability of farm practices in other regions.

Understanding trade-offs and synergies interlinking ecosystems services and human wellbeing

The reality of ecosystem management involves making difficult choices about trade-offs between different types of ecosystem services, and between the competing claims of different groups in society. Policy interventions in India tend to arrive at a balance of use or exploitation by groups of users, leading to loss of livelihoods and development opportunities for other claimants of competing, or the same, ecosystem services. There is lack of persuasive analysis for privileging one group of claimants over the other. Current approaches towards determining choices regarding ecosystem services

flow are top down and dependent on technocratic evaluations of the economic worth of ecosystem services. They ignore the complexity and dynamics of the process by which each group of stakeholders may have a voice and be participant in the negotiation concerning flow of benefits from ecosystem services.

In order to ensure equity in benefits to local and distant beneficiaries; make choices about increasing outflows of one ecosystem service in relation to the other; and to bring judiciousness to decisions regarding services derived, the gains and losses of each negotiation for the different stakeholders need to be acknowledged and factored into policy interventions relating to ecosystem management and resource use. Most trade-off analyses neglect the reality of how choices regarding the use of ecosystem services are made. This issue lies at the heart of this project, which seeks to address this knowledge gap by first hand examination of negotiation and decision-making process about trade-offs and synergies. By doing so, the

project will provide knowledge that can contribute to improvement of the quality of policies, institutional structures and management of the political economy of ecosystem services. To develop this deeper understanding of the process of negotiation and decision making about trade-offs in the use of ecosystem services and the corresponding impacts on poverty alleviation, the goals of two programmes—Land, Water and Livelihoods, and Ecosystem Services and Human Wellbeing—are bridged. The project is being carried out in collaboration with the University of Cambridge, University of Oxford and Winrock International India.

One of the key components of the project was to empirically document how different stakeholders actually negotiate and make choices. The objective was to bring field level dynamics into key questions of the research project: How do conflicting stakeholders make choices in specific empirical situations? What are the roles of different actors and how do they exercise power in this process? Whose values and interests are reflected

in final outcomes and to what extent can outcomes be seen to enhance social wellbeing? The project partners hope to combine expert led models of ecological and socio-economic tradeoffs with responses from stakeholders in specific, local contexts of conflict and negotiation, in order to arrive at a framework that will help policy makers develop better pro-poor strategies and intervention plans.

Preliminary observations from the household surveys ascertain water-based and agriculture-based provisioning services as the most important flows from the natural landscape. However, there have been significant changes in the last twenty years in both the services, which are affecting the benefits that people derive from them. For example, for upstream farmers, growing demand for food-for-subsistence at the household level is forcing an intensification of agricultural practices, which translates into higher water demand and pressure on land. This

is exaggerated by growing family sizes, small land holdings, changing livelihood options and occupational alternatives. A joint stakeholder meeting with farmers from six villages in the Malaprabha basin was held in December 2011 at Belgaum, Karnataka to explore their perceptions of ecosystem services and associated trade-offs. The participants identified the decline in household level food production due to competing demands for water as a key issue. Water shortages have also impacted livestock and fodder production. An improvement in forest condition due to protection has led to more attacks on crops by wild animals, resulting in increased human-wildlife conflict. Furthermore, the area has witnessed a sharp increase in mineral-ore mining activities, which has impacted both the quality and quantity of water in the catchment area. In contrast, a workshop attended by experts, which was held in Bengaluru in January 2012, identified climate change with increased frequency of extreme events, urban

expansion and increased material consumption as the three main drivers likely to result in trade-offs between different ecosystem services and associated stakeholders in the Western Ghats region.

These findings raise important issues relating to how perceptions about ecosystem services, threats to their status, and winners and losers, vary between experts and local stakeholders. The findings reflect different empirical knowledge, different world views and are at least partly shaped by differing temporal and spatial frames of reference. By juxtaposing these findings, the project hopes to shed greater light on the broader context within which decisions are made with respect to ecosystem services, and to highlight the risk that policy and decision makers may not always be cognisant of the ways in which poor and marginalised groups perceive and value ecosystem services.





education

Academy for Conservation Science and Sustainability Studies

Doctoral programme

The stand-apart quality of ATREE's PhD programme is its interdisciplinary slant in approaching issues of sustainable development and conservation. This is reflected in the courses offered, as well as in the research topics that students elect to work on.

The ecology course and fundamentals of environmental science address knowledge gaps in these topics for students with a social sciences

background. Courses on basic economics, sociology and issues and approaches in conservation and sustainable development orient students to perspectives on human engagements with nature. Strengthening rigour of methods applied are courses that examine technical merits and demerits of the quantitative and qualitative research methods applied to natural sciences and social sciences based research.

Science communication is now a credited course that students must take up. Electives cover area of focused, applied knowledge: systematic biology, geo-spatial tools and techniques, plant-animal interactions for conservation application, theory and applications of ecological economics, environmental history, and introduction to political ecology.

The research interests of the new batch cover the political ecology of sea turtle conservation in India; identifying priority areas of conservation in freshwater habitats; understanding interactions between forests, soil and water in mountain ecosystems; interactions between policies such as REDD and the FRA from global as well as local context with respect to particularly vulnerable groups of people; small carnivore ecology, etc.



ATREE added another 16 PhD students to its current crop of 23 doctoral students in 2011. Five students from previous batches presented their synopsis this year. Three PhD defences are lined up for the latter half of 2012. We have guided 23 internships in 2011–12. Visitors from various organisations have offered the ‘Wednesday Talks@ ATREE’, a weekly programme started by the Academy office, to promote discussion on the various perspectives in conservation and development at local, regional and global scales. In 2011–12 we had 49 such talks and film screenings.

Environment and conservation education

Nesara: Newsletter of DBT’s Natural Resources Awareness (DNA) Club

‘The message is simple, educate our young on the value of our natural resources and the need to conserve them, and they will take it from there,’ read the editorial of the first issue

of *Nesara* (Rising Sun). This Kannada–English newsletter created from writings, photographs and art contributed by DNA Club students and the training resources, sums up the objectives of the DNA programme, for which ATREE is the regional resource agency.

This year, students presented energy, waste and water audits of their schools at the fourth year closure of the DNA activities. Students from schools in the Western Ghats and coastal areas of Karnataka visited the plains: Dombaranahalli, Tumkur for the year’s ending event.

Vacation training programme

This year’s bioresource course for Std 10+ students was conducted over 19 days in May 2012. Ten students attended this course, which consisted of lectures, institutional visits and several field visits. The course balances theory (24 lectures) with applications (seven hands on activities, six field trips and two institutional visits), as well as grounding in basic skills for field work, like tree climbing, trapping insects, identifying diatoms, etc.

Jalapaadom

Students pondered on their role in global warming, articulated their understanding of depleting resources, discussed environmental degradation and debated merits of farming practices at the second Student Wetland Congress, Alappuzha.

Kitchen vegetable garden

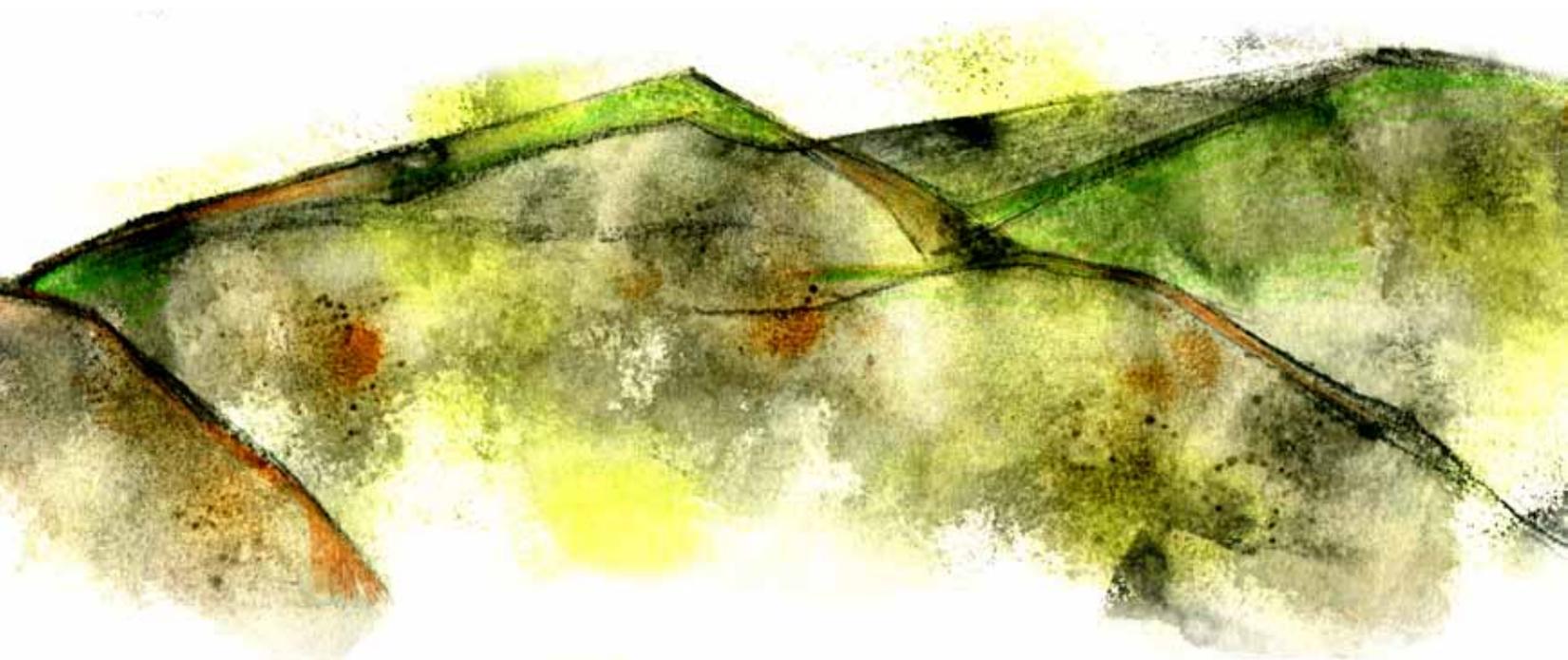
12–14 year olds of Yalachavadi Higher Primary School, Kankapura learnt about native varieties of vegetables, developing and maintaining kitchen gardens in small and large areas, in a training on kitchen gardens organized by ATREE and the Inner Wheel Club of Bengaluru.

Kids in the canopy

Students of Kendriya Vidyalaya rediscovered the rainforest from 80 feet above the ground as part of the Nature Tracking workshop organised by the Agasthyamalai CCC. They learnt the technique of single rope access, safety protocols of climbing trees, and then climbed the tall *Cullenia* tree in the rainforest. They also learnt about the ecosystem services that such forests provide to the surrounding regions.







Capacity building

Expertise in geospatial technologies

ATREE's Ecoinformatics Lab uses geospatial technologies to facilitate research, conservation planning, and awareness building within ATREE, and with partners in academic, governmental, non-governmental organisations, and citizen science initiatives. Some of its projects include biodiversity mapping, estimation of ecosystem services of biodiversity-rich areas, analysis of processes and patterns in landscapes, analyses of land use and land cover change, species distribution modeling and prediction. The sections below describe some of the work that the Lab has been engaged in recently.

Facilitating research in ATREE

The Ecoinformatics Lab is an invaluable resource to the social and natural sciences teams within ATREE.

► The Lab worked with the ecological economics team to analyze the impact of economic policies on rural agriculture (see story on sustainable agriculture 'Factoring the future into farming' on page 24). One of the requirements of the research team was to estimate the extent and nature of cropping pattern change across a temporal frame. With the aid of satellite images, the Lab estimated the extent and nature of the transition from food crops to plantation crops or use of land for non-agricultural purposes during the post economic liberalization in early 1990s in 14 villages across various agro-climatic zones in Karnataka.

► In another study, the Lab evaluated the efficiency and appropriateness of a widely used technique for forest fire mapping, in the context of Western Ghats area. The widely used datasets

such as MODIS active fire product were found to be inappropriate for assessing the extent of forest fire in the tropical forests of Western Ghats.

► Assessment of forest cover recovery in Kalakkad-Mundanthurai Tiger Reserve after the implementation of an Integrated Conservation and Development Programme (ICDP), which aimed to reduce forest dependency of forest fringe communities. The study mapped the trends in forest cover change using satellite images of pre- and post-periods of the implementation.

See story on participatory resource mapping of the Vembanad lake ecosystem on page 39.



Collaborations

Karnataka Biodiversity Atlas

The Karnataka Biodiversity Board commissioned the Lab to develop a web-based atlas mapping Karnataka's biodiversity. We are at the stage of collating secondary data on various biodiversity themes from government institutions, academia, NGOs and individuals. The Lab will make the atlas accessible to students, teachers, researchers and professionals through a dynamic WebGIS environment, using open source technology. It will conform to global standards set by the Open Geospatial Consortium for spatial data exchange.

Mapping overlaps in mining interests and claims of wildlife habitats

Greenpeace India wanted to analyze conflicts and conservation threats

posed by mining activity in central India. The Lab is creating spatial databases, including layers of detailed maps of thirteen coal fields in five central Indian states, important habitats of tiger, leopard and elephant, forest cover and wildlife corridors.

Online spatial data archive

In course of the services and other research work that is conducted by the Lab, a large amount of spatial data is created and stored for ready reference and future use. Since its existence, the Lab has had projects covering several areas within the country, with special focus on the Western Ghats. The Lab has recently been involved in creating an online spatial archive containing bulk of these data sets using open source WebGIS technologies. The database is searchable and query-able, and allows for download of certain datasets directly from the web interface for ease of use. The product will be launched soon and will be accessible to ATREE staff at multiple locations via a web-interface.

Trainings

The Lab's specialized training in applications of geospatial technology in conservation is an annual offering of the Academy for Conservation Sciences and Sustainability Studies. The course covers remote sensing, Geographical Information Systems and GPS technology for various applications, and is offered to ATREE's doctoral students and, separately, to amateurs and professionals. This hands-on course introduces concepts, imparts software training, as well as training in the use of field instruments used for geographical referencing.

Methods for Geographical Ecology

A two-day workshop on 'Methods for Geographical Ecology' was held at the Indian Institute of Bank Management, Guwahati, Assam, for students and researchers of Northeast India. The chief instructor was Dr John J. Kineman, Senior Research Scientist, Ecosystem Science Division Cooperative Institute for Research in the Environmental Sciences, University of Colorado, Boulder, and Honorary Senior Fellow, ATREE. He was assisted by D Malleswar of the Sri Sathya Sai Institute of Higher Learning, Prashanthi Nilayam, Andhra Pradesh.

The workshop focused on using the GIS software Idrisi (data, functions, navigation and display). There were lectures on various aspects like GIS for ecological applications, geographic analysis, spatial and temporal modelling inference, and ecological niche modelling. The practical, hands-on exercises covered maps as data (exploring data types and geographical objects), map query (extracting information and reporting), map algebra (data processing and analysis), classification and object definition, multiple criteria analysis, analytical models, terrain and hydrology, and cost analysis. Eighteen participants from Assam, Arunachal Pradesh, Manipur and Sikkim benefited from the workshop.

How religious sentiment helped clean a lake

The Vembanad CERC programme used the spirit of the *mandala* season, associated with maintaining purity of body and mind, to encourage local conservation action. Appealing to fisherfolk of Vembanad, who routinely feel frustrated about plastic waste getting tangled in fishing nets, the team



proposed that the idea of purifying mind and body be extended to surroundings as well. Partly because of the appeal of the idea, and partly because of the obvious advantages, fishers responded to the suggestion. Fishermen collected 40 sacks of plastic over the 41 days period. The practicality of approach and the fervour of the idea got the media and policy makers interested as well.

The exercise gave fishers pause to reconsider their actions when they threw plastic in the lake. Disentangling a snarled net can take hours. In addition, as most of these stakeholders have been participants in other CERC initiatives as well, notably the annual fish count, there is basic consciousness of the problems pertaining to Vembanad wetland health. This year's fish count had, in fact, blamed settled inorganic pollution for adversely

affecting fish that attach their eggs to lake-bottom soil, and bottom feeders like gobids. Plastics on lakebeds have also affected clam deposits. These changes impact fishers and clam collectors' livelihoods directly. The achievement in the story is that the bracketed timeframe of the exercise has been put aside; cleaning the lake of plastic is going to be a round-the-year activity now.

Lantana: building artisan self sufficiency

MM Hills' lantana artisan community, Lantana Craft Centres (LCC), and ATREE have been holding a lantana mela every year, for the last three years, to link the artisans with mainstream marketing and financial institutions, and to popularize lantana craft.

This year's mela, in April 2011, saw the release of a lantana utility products training manual and bilingual brochure for the benefit of artisan visitors from Javadi Hills, Palani Hills, Soliga artisans from MM Hills, Narkundi and BR Hills. ATREE facilitated links between the LCCs and NABARD-Karnataka for financial aid. With NABARD support, ATREE organized a series of product design workshops for artisans. A resource person from Indigenous Science and Technology Study Centre, Wayanad conducted these workshops, at the end of which the team developed 45 new products that were perceived to have utility value and local market potential. This became a prototype to train artisans from Palar and Hannehola villages as well. The products ranged from key holders, key chains, candle stands, photo frames, clocks, mobile



phone stands, necklaces, studs, lampshades, etc. A training manual was prepared for the benefit of the local artisans.

Channapatna is 60 km from Bengaluru and world famous for its lacware toys made from *Wrightia tinctoria* (*Pala indigo*). The toys are exported to Europe and USA. In recent years, due to excessive harvesting, *Wrightia tinctoria* populations have been depleted in this region. ATREE, with the help of Channapatna artisans, developed more than 25 toys designs, using lantana as replacement raw material. A lantana toys training unit in Hannehola village trains artisans in crafting toys and utility products under the guidance of a Channapatna artist. Tribes India, a marketing outlet of TRIFED, has come forward to market these toys across India, besides lending support to extend trainings in Javadi Hills and Palani Hills.

Corporate training programmes

ATREE has been organising day-long volunteering programmes for HSBC employees as part of the HSBC climate partnership programme in collaboration with Earthwatch Institute, India. The focus of this programme is to create awareness among volunteers about biodiversity, the need to conserve native species of plants and animals in their natural environment, and the threats posed by climate change on biodiversity, and in turn on human wellbeing. The programme also aims to increase volunteer awareness on distribution of biodiversity, the implications of biodiversity loss, the need for conserving biodiversity, and the services that the natural environment provides to human beings. Volunteers, with initial guidance, monitor and document plant and bird diversity, gather data on phenology, and exchange ideas on action to mitigate

climate change. These programmes have been conducted in Bilikal Reserve Forest (BRF) of Kanakapura taluk and in Forest Trails – a privately owned estate adjoining the Bannerghatta National Park (BNP) in Anekal taluk.

Bird surveys in the wetlands of Tamil Nadu

In 2008–09, the Agasthyamalai CCC team surveyed 177 wetlands in the buffer zone of the Kalakad Mundanthurai Tiger Reserve (KMTR) and recorded more than 13,164 birds belonging to 68 species. The 2008–09 survey was followed by a winter survey of the larger wetlands closer to the mouth of the Tamiraparani river, of which little was known. About 42 tanks were surveyed in January 2011 and 2012, and 62 species of waterfowl with their total numbers ranging from 30 to 32 thousand each year have been counted in the area.

The river Tamiraparani and its perennial tributaries, the Manimuthar, Pachaiyar, Kodumudiyar, Gadanathi, Ramanathi and Nambiar feed the matrix of human made river-canal-tank networks in the Agasthyamalai region in Tamil Nadu. These wetlands and surrounding paddy fields support a high diversity of waders, divers and shorebirds, most of which are winter migrants. The old trees and acacia plantations support heronries, while the palmyra traditionally planted around the tanks

offer roosting sites for numerous resident birds. Partially submerged trees in the middle of the tanks are even more precious, as roosting birds seem to prefer these. Tirunelveli alone has 2500 wetlands. However these habitats are under threat due to development activities and land reclamation for agriculture.

In an attempt to build stewardship and garner public support for the wetlands, a waterfowl census was started in 2011. Since wetland birds are easy to count, bird surveys provide easy opportunity for creating an involved citizen science event. The second waterfowl census was carried out in Tirunelveli and Tuticorin districts in January 2012. Over 55 volunteers, from ages 20 to 60, participated in the survey. Volunteers were provided orientation to bird watching and identification, as many were new to the activity. Fifty three small and big tanks were surveyed for birds and associated aquatic plants, and the general status of the wetland. Volunteers identified 62 species of birds, including many migratory species. Storks, pelicans, herons, jacanas, ibises, egrets, pochards, wigeons, tern, are some of the names that the bird census volunteers are now familiar with.

The event tried to draw attention to the fact that traditional methods of land use are eroding, resulting in degradation of the environment.



education

Community Conservation Centres



Kanakapura

Farmland treescapes of Karnataka

Why do farmers value and retain certain trees and fell others? In a delightful example of reciprocal learning, the Kanakapura team, which has been organizing conservation awareness programmes with school children and farmers for over eight years, learnt to appreciate local perspectives on tree biodiversity. The result is a handbook of common farmland tree species of the drylands of Karnataka, which will be released shortly. The book focuses on domesticated 'wild' trees that dot the semi-arid landscape of the state.

The book '*Common dryland trees of Karnataka*' chronicles farmland tree biodiversity, and its place in the semiarid agricultural-rural landscape of Karnataka. Fruit-bearing trees such as mango, coconut, etc., are invariably well known and are not included here. The Kannada-English bilingual tome includes 83 species—77 native and 6 exotic—belonging to 35 different families. It outlines the biology, ecology and varied uses of these trees. The authors have selected scientific illustrations and text that even those from non-science streams would find easy to use to identify the trees.

The Kanakapura team felt that a book like this would help document knowledge of native tree species. The team hopes that being better informed about trees will generate an interest in their conservation and widespread planting, and application in agriculture, eco-restoration and landscaping in particular. The authors hope that the book will appeal to students, teachers, farmers, amateur farmers, naturalists, environmentalists, landscapers and anyone interested in plants and trees.



MM Hills

Lantana in different avtaar

Lantana has been central to the MM Hills story, whether in the studies conducted to track lantana's march across the landscape, parleys with forest officials regarding the management of this weed, studies of biodiversity impacts of lantana, or the experiment in the utilisation of this invasive weed to alleviate poverty and provide alternative livelihood strategy to forest-dwelling communities. In this year's lantana mela, we introduced an awareness poster, which traced the history of lantana, the invasive weed that takes over forests and fallows, and its subsequent role in improving the livelihoods of forest-dwelling

communities. As a highlight of the work at MM Hills, and the growing autonomy of the Lantana Craft Centres, we share interesting parts from the poster.

1807

The British introduce South American species, *Lantana camara*, into the Indian landscape. Lantana spreads across forests, fields and fallow lands and dominates landscapes at the expense of native plants, wildlife habitat and ecosystem services.

1940

Koravas and other communities start using lantana for basketry.

1992

Dr Anil Joshi, founder of Himalayan Environmental Studies and Conservation Organisation, Dehradun, promotes the use of lantana to make furniture in Uttaranchal.

2004

ATREE introduces lantana craft to forest-dependent communities in Male Mahadeshwara Hills, Karnataka.

2005–09

ATREE disseminates technology and craft to NGOs and forest communities in Karnataka, Tamil Nadu and Kerala. Establishes Lantana Craft Centres (LCC) to promote lantana craft among tribal and other forest-dwelling communities.

2009

Government bodies recognise LCC craftsmen and provide market channels for lantana products.

Today

- ▶ Over 350 craftspeople have been trained in lantana craft
- ▶ Trained artisans derive nearly 80% of their cash income from lantana craft
- ▶ 80% of these folk are women

- ▶ Average monthly income of an artisan ranges from Rs 2500 to Rs 6000
- ▶ Lantana is now being used to make furniture, toys and ornaments
- ▶ Over 50 lantana products are being designed and marketed

Also read how lantana is being used instead of depleted *Tictonia wrightia* trees, the wood of which is used in the heritage art of Channapatna toy making. Page 36

KMTR

More than lotus and lily: wetland plants in KMTR

Villages in the KMTR buffer zone are located in a mosaic of farmlands irrigated by ponds and canals. Ponds of varying size, depth and seasonality support various plant groups that are adapted to these habitats. There is currently no information on wetland plants, not only for the region but generally for south India. The Agasthyamalai CCC (based on previous research on wetland conservation) has made baseline data generation on the distribution and status of wetland plants a research priority. The CCC plans to build stewardship for aquatic plant life by creating awareness of its ecological and economic importance as a way to protect the wetland ecosystem.

Exploratory trips over a one-year period have resulted in information on wetland floristic diversity and habitat quality. ATREE is documenting the potential of these plants and some invasive species as bioresources. We have characterized plant community in each pond by its physical features and habitat heterogeneity, as well as disturbances such as pollution. Plant communities surveyed include completely and



partially submerged plants, and floating—rooted as well as free floating plants.

We found 55 species of visibly large seed plants, including a few species of pteridophytes such as *Isoetes coromandelina*. The total number of wetland plants could be more than 150 if grasses, sedges and other associated plants are included. Lotus and lily are some of the larger plants that prefer deeper water. Shallow areas had rooted plants with their floating leaves and emergent flowers such as *Ottelia* sp., *Aponogeton* spp. We found insectivorous plants such as *Utricularia obsoleta*, *Drosera indica*, and *D. burmanni*; and endemic plants, *Theriophonum sivagangam* and

T. manickamii. Invasive plants such as *Eichhornia crassipes*, *Ipomoea fistulosa*, *Pistia stratiotes*, were found to inhabit polluted wetlands and canals. We have also collected a few plants that could be either new to science or, so far, not known from the wetlands of Tamil Nadu.

These aquatic plants provide food and habitat to birds, fishes, frogs, insects and molluscs. They are also of use to the local community as food, medicine, and saleable produce. Clayey soil from the pond, rich with nutrients from dead plant matter, subsidises fertilizer input in the fields. Leaves of lotus and lily, fruits of *mullukaye* (*Trapanatans*) are sold in the market. *Cryptocoryne spiralis*, a raw material for the pharmaceutical industry, is exported. Indeed, harvesters say that

it has been so over-harvested that the resource base is endangered.

The primary information gathered will be used to develop a bilingual field guide in Tamil and English, as well as hand-outs for children as part of conservation education programme from Agasthyamalai CCC.

Vembanad Online resource map

Over the past years, Vembanad CERC has initiated several participatory platforms for creating awareness about the wetland ecosystem among its many stakeholders: fisher and clam communities, farmers, students,





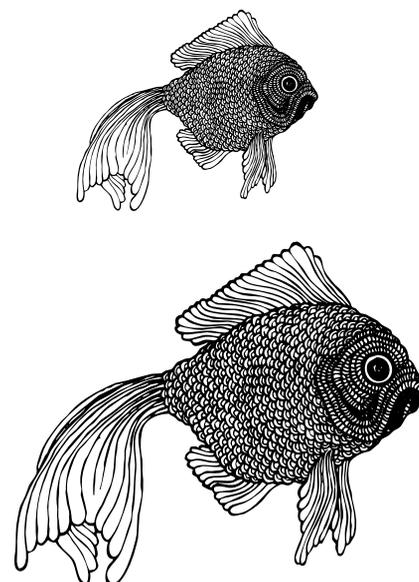
residents, houseboat operators, politicians, etc. These initiatives have ranged from water quality testing, to lessons on water—*Jalapaadom*—for school and college students, annual surveys of fish and shell fish populations, lake protection forums, policy discussions with gram panchayats, among others. The lake, a Ramsar site, has been subject to large scale human intervention—in the form of land reclamation, exposure to pollutants from agriculture, industry and tourism, and manipulation of natural salt water flows through the Thanneermukkom barrage, leading to changes in wetland health and biodiversity. Despite its unique status, there is poor documentation of its natural resources, creating a blind spot in the structuring of appropriate management plans for the lake. This year, to emphasize the unique biodiversity values of the lake, and to create a basis for focused conservation action by concerned stakeholders, Vembanad CERC, along with users of the resources of Vembanad lake, and with support from ATREE's Ecoinformatics Lab

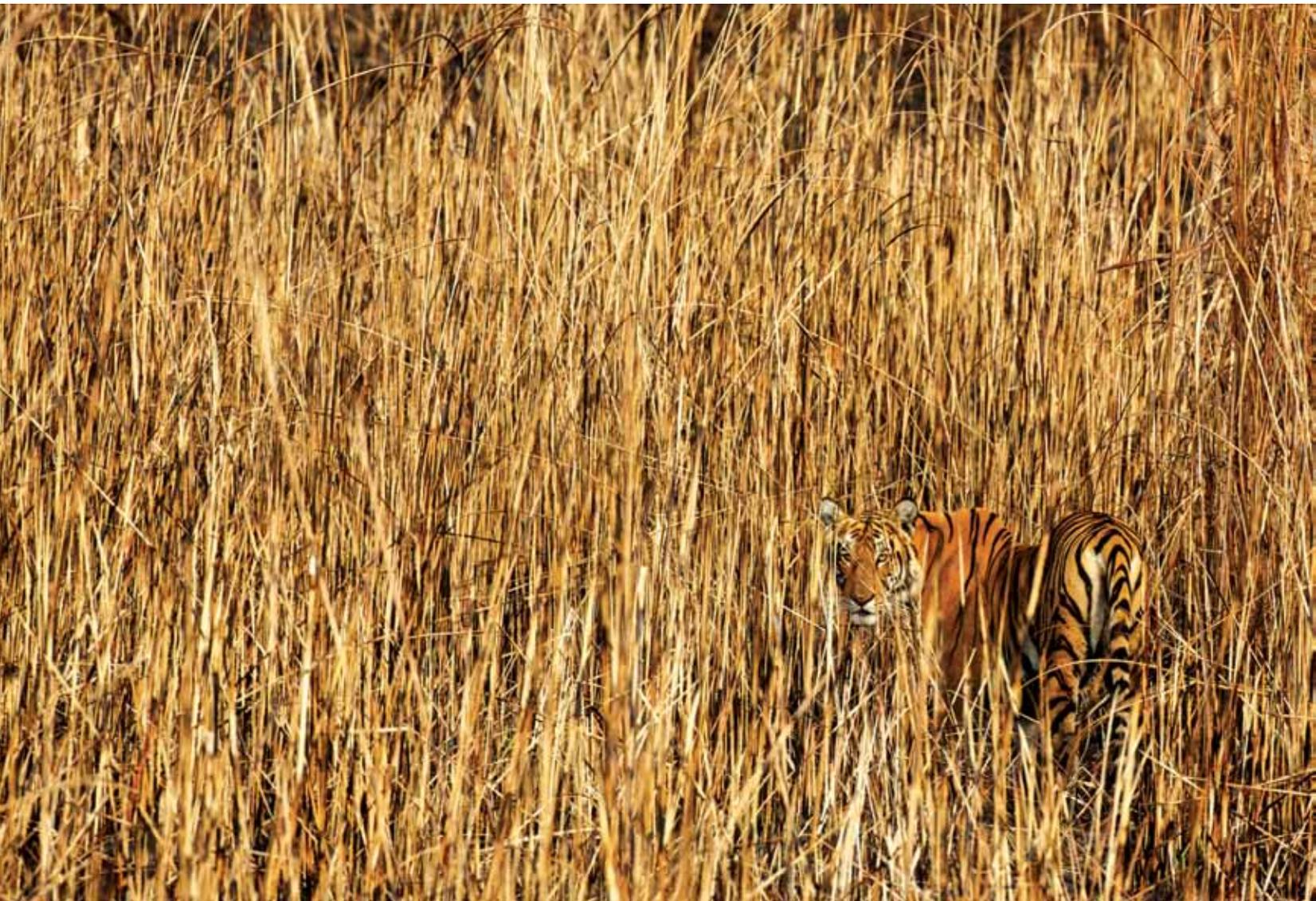
(see pages 32 and 33 for more on the Lab) has initiated participatory mapping of natural resources of the wetland. The outcome of this exercise will be in the form of a resource map, which will be available in the public domain for reference.

The process requires collection of primary data. The team has initiated participatory mapping by the primary stakeholders through focus group discussions, transect walks along the banks of the river and interaction with residents, interviews with senior citizens for older narratives, discussions and mapping exercise with clam societies, Lake Protection Forums and the Gram Panchayat committees. Besides providing a picture of the current status, this exercise is also revealing past and present trends, and cause-effect relationships. Along with mapping of resources, zones used for subsistence activities such as fishing, sand mining, clam collection, gathering of fodder, house boats, resorts, tourism activities in the lake, weed-covered areas and any

other significant use of the lake will also be mapped.

The programme is funded by the Department of Environment and Climate Change, Government of Kerala.





outreach

Action research in the Eastern Himalayas

ATREE has been investing in long-term outreach in the Eastern Himalayas for over a decade now, with a major focus on promoting sustainable resource use, building local institutions, capacity building and poverty alleviation.

It is aimed at improving the livelihood security of forest and forest-fringe communities, raising awareness and promoting conservation and sustainable use of bioresources in the region. The Eastern Himalayas Programme works directly with local institutions and communities in the Darjeeling and Sikkim Himalayas, and in Assam, and through a range of local partners in the other states of northeast India.

Enhancing conservation and livelihoods: Darjeeling and Sikkim

ATREE has been working in the north district of Sikkim and in villages around Senchel Wildlife Sanctuary and Singalila National Park in Darjeeling through the Department of Biotechnology supported project titled 'Technological Innovations and Ecological Research for the Sustainable Use of Bioresources'. The focus continues to be on understanding change through participatory ecological research, enhancing livelihood security, and testing and developing workable models of natural resource management. Over the last year, the programme has also begun assessing the social and ecological impacts of its work, particularly the formation of local institutions, networks and self-help groups (SHG), the conservation impacts of interventions and the contributions to household incomes.

The programme in the Darjeeling Himalaya continues to promote

interventions to improve the livelihoods of forest and forest-fringe communities. These include low cost greenhouses, beekeeping and mushroom cultivation. In addition to providing bee-keeping training and partial support for bee boxes, communities are being encouraged to restore and restock the nearby forest patches and farm margins with food and nectar plants. The programme is also reviving inactive SHGs, providing training for SHG formation, and enabling linkages with line departments to leverage support for community development interventions through various state schemes.

In Eastern Himalayas, where there is limited knowledge on the impacts of climate change, indigenous communities and their wealth of traditional ecological knowledge could guide and complement scientific studies. In addition to examining resource dependence and use, a study is looking at climate change impacts on patterns of resource use by Dokpas, nomadic pastoralists of North



Sikkim. Two papers published by ATREE researchers in 2011 have shown how local perceptions of climate change, gathered through a study in Darjeeling and eastern Nepal, have been validated by scientific evidence in the Himalayas. The study shows how local knowledge can be rapidly and efficiently gathered using systematic tools and that such knowledge can help scientists test specific hypotheses, and policy makers to design mitigation and adaptation strategies for climate change.

Income generation through traditional handicrafts: An initiative in a Karbi village

The fringe villages of the Kaziranga National Park (KNP) in Assam are an integral part of the landscape around the protected area, and hence, a key stakeholder in the overarching goal of conservation. The Assamese, Nepali, Santhal, Mishing, Mikir and Karbi populations of these villages are mostly marginal agriculturists, some rear livestock and a few depend on daily

wage labour. They have remained poor and impoverished, with limited means of sustainable livelihoods.

The Forest Department (FD) established Eco-Development Committees (EDCs) and SHGs in order to organize its capacity building and development activities in the area. ATREE, under the aegis of UNESCO's World Heritage Biodiversity Programme, has been working with them to engage with the local communities. To align activities as per community needs, the FD carried out Participatory Research Appraisals (PRA) using interdisciplinary, exploratory studies relying on community interaction and indigenous knowledge.

A survey conducted in Nutundanga, on the western range of KNP, indicated that a micro-enterprise of traditional handicrafts using bamboo and timber might be a feasible option for this Karbi tribal village. Nutundanga village consists of one hamlet with 58 families (300 individuals). The villagers had shifted to daily labour after having to abandon agriculture due to lack of

modern tools, crop depredation by wild animals and consequent poor yield.

The national highway running close to the village was identified as a potential source of customers. The services of a local skilled person with expertise in crafting wooden artifacts were called in. And tools provided. Willing youth have learnt to craft animal figures—rhino, deer and other wildlife, besides flower vases, pen-stands, trays among utility and decorative items. The kiosk also stores handloom items locally manufactured by women working from home. This initiative is managed by a 14-member SHG.

The response to the roadside kiosk, inaugurated in early 2012, has been good. The effort has generated goodwill among the villagers. Continued support of the forest department and the project, coupled with perseverance of the village members will go a long way in ensuring sustainability of this pilot community livelihood initiative.

Research for park management in Kaziranga

The grasslands of Kaziranga National Park (KNP) host a diverse set of large and small grazing ungulates, making it a preferred location to test for grazing compensation and facilitation in an important grazing system outside Africa. Studies here are also important as there have been significant directional changes in grassland characteristics and distribution in parts of KNP over the last decade. These changes may have been driven by changes in climate and hydrology, changes in the fire regimes, expansion of invasive species, or the influence of grazing by wild herbivores and domestic livestock. The changes are already evident in plant species composition and community structure.

In this context, habitat management with specific reference to the grassland ecosystem has emerged as an important management imperative for Kaziranga. ATREE, in association with the KNP

management, has initiated a pilot research project on ecosystem processes to study the effect of grazing on plant species composition and biomass production in the National Park. Three enclosure complexes have been raised inside the Park as experimental plots and subject to differential grazing pressure. These plots are being monitored for plant species, soil moisture and biomass production. The objective is to test the hypothesis of a change in grassland structure due to grazing by herbivore populations and subsequently develop a restoration model for overgrazed grasslands. This study is the first of its kind and will help Park authorities in better habitat management for *in situ* conservation of biological diversity.

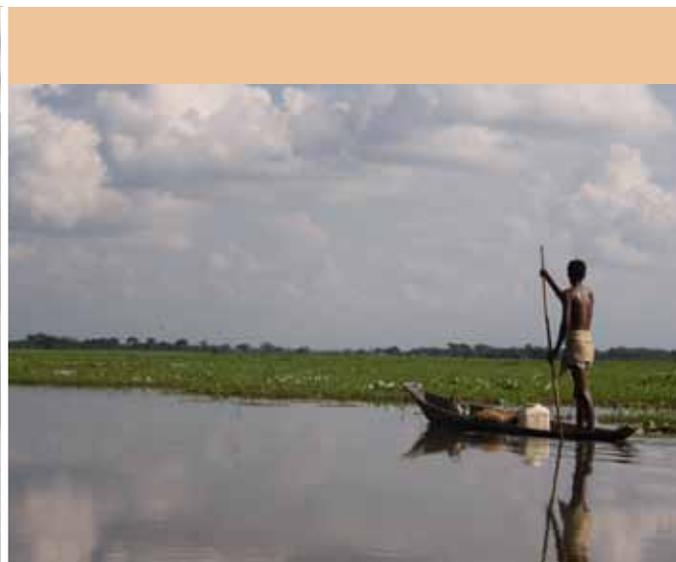
Assam: Scholarship programme

For the second year running in the World Heritage Biodiversity Programme for India (WHBPI) project in Assam, ATREE undertook a scholarship programme

for young scholars from schools in the fringe villages of Manas and Kaziranga National Parks. The students are selected on the basis of means and merit. This is an outreach programme that targets teachers and parents as well as students, with the aim of raising awareness on the value of conserving the world heritage sites where they live.

ATREE Small Grants for research in NE India

A total of 14 Small Grants are being supported by ATREE. Four additional grants were awarded in January 2012: evaluating the ecological and socio-economic drivers of human–elephant conflict in a fragmented, human-dominated landscape in Garo Hills; non-invasive genetic assessment of the status of tiger and other major co-predators in the protected areas of Meghalaya; promoting conservation based livelihoods through community based eco-tourism in the Balpakram-Baghmara landscape, Meghalaya; and,







field survey with education awareness for conservation of primates in Talle Wildlife Sanctuary, Arunachal Pradesh.

The ATREE Small Grants for Research in NE India have been made possible by a consortium of funds provided by the Ford Foundation, MacArthur Foundation and the National Geographic Society. It is a Trust Fund established by ATREE to continue supporting conservation research and local conservation action in the Eastern Himalayas of India. The objective of the grants programme is to support research and field work to fill critical information gaps in monographic and taxonomic work; build biodiversity databases for existing information in the public domain; support action research for conservation of Critically Endangered, Endangered and Endemic species; and, provide incremental support to ongoing targeted high impact projects having the potential for immediate conservation impact. A sub-component supports doctoral studies in conservation biology with focus on the Eastern Himalayas region of India.

Small Grants programme for NGOs/CBOs

This project, supported by Ford Foundation, has allowed ATREE to work with six different NGOs in five states of northeast India. These NGOs are grassroots organisations and have been effective in mobilising community action for conservation.

Participatory Action for Rural Transformation (PART), the partner NGO in Aibawk village in Mizoram, has revived 48 inactive SHGs originally formed by the District Rural Development Agency (DRDA). These SHGs are spread across 14 villages and all of them have accumulated capital in the form of monetary savings. Last November, these SHGs came together to create an apex body called Chhimphei Federation of SHGs. Grassroots organisations like PART are also effective in working with other local institutions, including traditional village institutions such as Joint Action Committees (JACs). PART is working with nine JACs in and around Aibawk on conservation of Village Reserve Forests, including capacity building of JACs

through training and addressing issues like illegal logging and extending the area of existing Village Reserve Forests. In Ziro, Lower Subansiri District of Arunachal Pradesh, the grantee Future Generations (FG) Arunachal has been working with 17 SHGs involved in activities like fish farming, weaving and kitchen gardening. FG has helped in federating the SHGs into an apex body called Ngungo Ziro, which is now taking a lead in implementing conservation activities. Awareness campaigns are being conducted regularly in schools, flora and fauna survey is being conducted to document local biodiversity, and Ngungo Ziro has been made a member of the Wildlife Advisory Committee for Lower Subansiri District. In 2011, a moth documented by Ngungo Ziro was confirmed by Bombay Natural History Society and the British Museum as a species new to science.

While grassroots organisations can be effective in mobilising local people, tangible benefits can provide an incentive for local conservation. In Mimi Village, in the far-flung Kiphre District of Nagaland, ATREE's local partner International Border People's Welfare Organisation (IBAPWO) has worked with the village council to build a drinking water system. A total of 180 households have benefited from piped water supplied through seven community taps. The watershed from where water is tapped is partly owned by different clans and the rest is under private ownership. IBAPWO has negotiated an agreement with the owners to create a community reserve forest area to protect the watershed spread over 5 sq km. Addressing more immediate needs can spur local action on issues like conservation which can otherwise be difficult to realise even if there is general awareness on environmental issues.



ATREE Small Grants Programme

The Academy for Conservation and Sustainability Studies initiated a small grants programme with support from the Jamsetji Tata Trust funding in order to enable research at local levels in conservation and environmental sustainability. In 2011, the Academy supported eight natural sciences projects whose research was located mainly in the Western Ghats, and seven social science based studies exploring social linkages to conservation and sustainability issues across the Western Ghats and the northeast part of the country.

The Academy organized a one-day workshop on 22 July 2011 for grantees to share the findings of their research. Research topics ranged from study of impact of conservation-induced displacement on livelihood and coping strategies of the host community, to a socio-economic evaluation of watershed development programmes in India, to a documentary on the impact of religious tourism on the forests of Kalakad Mundanthurai Tiger Reserve: 'What in the name of God!', an illustrated guide to freshwater diatoms of the Western Ghats, among others.

CEPF Western Ghats

ATREE serves as the Regional Implementation Team (RIT) for on ground execution of a conservation strategy for the Western Ghats. This strategy is guided by the Western Ghats Ecosystem Profile, developed by the Critical Ecosystem Partnership Fund (CEPF) in consultation with conservation and scientific institutions, and with inputs from civil society. The CEPF global programme provides strategic assistance in the form of grants to non-governmental organizations, community groups and other civil society partners to locally protect and safeguard biodiversity hotspots with the participation and involvement of civil society, and has been a key ATREE partner since 2007. The objectives of these grants are to enable action by communities and partnerships to ensure conservation, enhance connectivity in corridors, and to improve conservation of globally threatened species of the Western Ghats through systematic conservation planning and action.

The themes of some of the newly initiated small grant projects (adding up to 40 grants since 2009) include: large mammal assessments on

highways; conservation outcomes through documentary making in Gundia; arboreal mammals status assessment and gap analysis; capacity building workshops – use of open source tool and GIS; sacred grove conservation through community involvement; outreach and awareness generation for CEPF grants in Uttara Kannada and the Annamalais; establishment of community conservation reserve; Lantana removal and restoration of native species; conservation of rocky plateaus in the Sahyadri-Konkan; and biodiversity value assessment using birds.





outreach

Policy

ATREE uses insights and knowledge generated through research to enable discussion on environmental policy decisions with policy makers, implementing agencies, local self-government, field practitioners, grassroots activists, advocacy groups, and the wider public.

Some of the ways we do this are by creating forums for policy dialogues with different stakeholders; by providing strategic environmental policy perspectives aimed towards improved natural resource governance and poverty alleviation; by developing decentralized, inclusive models of co-management of natural resources. The examples below outline our role in achieving policy impacts.

Discussions on REDD+

Though REDD and REDD+ are instruments envisioned by the United Nations to reduce carbon emissions from the forestry sector, there are concerns about the concept of REDD/REDD+, the nature of REDD funding, its architecture, its efficacy in reducing emissions and its potential impacts on biodiversity and forest-dependent communities.

As part of the Noragric–ATREE partnership, ATREE and the University of Life Sciences (As, Norway) organised a policy dialogue in Delhi in July 2011, on the challenges and potential for implementing REDD+ in India, given the high commitments of their respective governments to REDD. Norway has an active REDD financing policy, and the Green India Mission (GIM) has a REDD+ component under the National Action Plan for Climate Change. Policy makers, academics, media persons and others participated.

ATREE's Dr Sharachchandra Lele outlined the motivation for REDD+, and the economic and theoretical aspects that made REDD+ attractive to the government. He recommended that the benefits of REDD+ must exceed their opportunity cost, while also being socially just—to local as well as international stakeholders. He questioned capacity of REDD+ in climate change mitigation, especially in absence of a global climate agreement. Talking about the impacts of REDD+ on democratic processes, he proposed that forest rights and governance reforms should be an absolute precondition for REDD+. Dr V R S Rawat, ICFRE, talked about the context for REDD+ in India, the quantifiable and non-quantifiable parameters in assessing impacts. He recommended next steps in making REDD+ a possibility, starting with changes required in joint forest and community forest management to make it more people-friendly; clarifying timber and carbon rights and identifying the beneficiaries of each.

He recommended pilot studies in different standard systems as part of the process preceding implementation. Dr Arild Vatn of Noragric presented options in governance structures for REDD+. He noted that national architectures required understanding of national and local circumstances; and needed to address issues of political accountability, national sovereignty, local participation, transparency, transaction costs and capacity to deliver co-benefits. Dr Vatn's insight was that actors continue to do what they are used to doing, while changes in perspectives are needed. He recommended the necessity of independent monitoring, reporting, verification and auditing systems for REDD.

H.E. Ms Ann Ollestad, Ambassador of Norway to India, was the chief guest. B. M. S. Rathore, Joint Secretary of the MoEF, gave an overview of the Green India Mission. Nitin Sethi, of the *Times of India*, and Chetan Agarwal, Winrock International India discussed issues arising from the main discussions. Dr Kanchan Chopra summed up the proceedings.

ATREE's role in the working group on ecosystem resilience, biodiversity and sustainable livelihoods for India's twelfth five-year plan

ATREE hosted the second meeting and helped draft the report of the working group on ecosystem resilience, biodiversity and sustainable livelihoods for the twelfth five-year plan, commissioned by the Planning Commission – Environment and Forest Division. The mandate of the working group was to undertake an assessment of the biodiversity sector from a scientific perspective, especially keeping in view the deficits in scope and implementation, of the twelfth five-year plan.

The participants, led by Dr Madhav Gadgil reviewed issues regarding monitoring and adaptive management of ecosystem services and biodiversity; possibilities on strengthening structures and capacities for local forest governance, including enabling provisions of the Forest Rights Act; livelihood security of forest-dependent communities; marine biodiversity conservation and fisherfolk rights; PES-payments for ecosystem and valuation of services and biodiversity; public accessibility to information and research; and India's commitments to international agreements.

The overarching recommendation of the group was to empower local stakeholders through legislative mechanisms, for bottom up, participatory governance of natural resources—whether terrestrial or marine. The working group suggested that the key to good environmental governance would need to be a combination of good science and participatory democratic processes.

The second emphasis was on transparent and open systems, with immediately implementable solutions: for instance an open, transparent, comprehensive web-based Environmental Information System providing for scrutiny as well as modifications/additions by members of the public. Radical reforms in the processes concerning Environmental Impact Analysis and Clearance processes were recommended. The team suggested protocols sensitive to specific social and ecological systems.

The group recommended a social audit process, on the lines of that for Mahatma Gandhi National Rural Employment Guarantee Act in Andhra Pradesh, for all environmental issues. It recommended ecorestoration as a means to bolstering provisioning (fuelwood, water, biomass, biofuel, medicines, pollination, etc) and

regulatory (flood control, erosion control, stream flow, etc) ecosystem services. It identified the Mahatma Gandhi National Rural Employment Guarantee Act as having the potential to take this forward through the length and breadth of the country.

A complete inventory of all plant, invertebrate and vertebrate species in India within the plan period was deemed a priority activity, requiring investments in numbers of trained taxonomists by expanding the network of institutions beyond Zoological and Botanical Surveys of India to complete this task. An open access national digital species repository using global protocols networked with other portals should be used to catalogue the species of India, they suggested.

The working group comprised of ministerial representatives from the departments of rural development, land resources, water resources, tribal welfare, earth sciences, environment and forestry; members of the planning commission; as well as researchers and academics from a number of institutions across the country. The Director, ATREE was an invited member of this working group.

Pursuing community forest rights: a Soliga story

Note: *ATREE's role in the following narrative has been of facilitator and enabler. It has taken the form of workshops to create awareness of the opportunities provided by the Forest Rights Act, interpretation of features of the Act, and sharing understanding of procedures required to chivvy the process of implementation of the Act. The prime role is of the Soliga community-based organization, Zilla Budakattu Girijana Abhivruddhi Sangha (ZBGAS). Other knowledge and outreach partners in this story are Kalpavriksh and VGKK.*

On 2 October 2011, twenty five Gram Sabhas in and around the Biligiri Rangaswamy Temple Wildlife Sanctuary (BRT) were awarded community forest rights (CFR), including access and ownership of non-timber forest produce (NTFP), fishing, grazing, cultural practice and rights to conserve and manage the forest. This was an unprecedented event as these community rights were granted in a protected area and tiger reserve. It was a culmination of a five-year struggle by the Soligas, who had been campaigning, under the umbrella of ZBGAS, for rights to forest produce harvest that had been banned in 2006 under the Wildlife Protection Act.

Soligas living within the BRT Wildlife Sanctuary began to actively seek rights under the Forest Rights Act as soon as the Act was notified in early 2008. ZBGAS held a series of meetings in Soliga hamlets (*podus*) in Chamarajanagar district. ZBGAS members disseminated information on the FRA and helped set up Forest Rights Committees, and ensured that there was adequate representation of Soligas in the sub-divisional level committee as well as the District Level committee. After two years of persevering effort, 1516 individual rights were granted in 2010 and 2011.

However, the Soligas had applied for community forest rights to NTFP even before they had applied for individual rights to cultivated land. This was due to their high dependence on NTFP income, which the ban on collection had adversely affected. Available data shows that 30 to 60% of the cash income of Soliga households was derived from NTFP. When Soliga awareness of the provisions within the Act grew, 25 Soliga Gram Sabhas added to their initial claim for NTFP by claiming other CFR rights such as fishing, grazing, conservation

and management, rights to intellectual property and the right to worship their nearly 500 sacred sites within the wildlife sanctuary.

Several approaches were used by Soligas in their campaign for rights: protests which included marches in the district headquarters, signed petitions to government officials, direct meetings with state government officials, and working directly with the tribal welfare officer and the district commissioners. Matters became complicated in September 2010 when the National Tiger Conservation Authority gave in-principle approval to notify BRT as a Tiger Reserve. This time, the Soliga protests caught the attention of the media. More than 2000 Soligas gathered in Chamarajanagar, the district headquarters, in a silent protest at which signed petitions rejecting the tiger reserve status were submitted to state and central government officials through the DC's office. Despite assurances that there would be a consultation on the issue, the state government notified BRT as a tiger reserve in January 2011, without obtaining final approval from the NTCA.

The Soligas continued their efforts until the CFR titles were signed in July 2011. Community forest rights have been granted to 25 Gram Sabhas formed by 35 *podus* of BRT. The remaining 27 *podus* are now in the process of claiming similar rights, which will cover the entire sanctuary. The 25 Gram Sabhas have claimed rights in three forest ranges out of the five that comprise BRT.

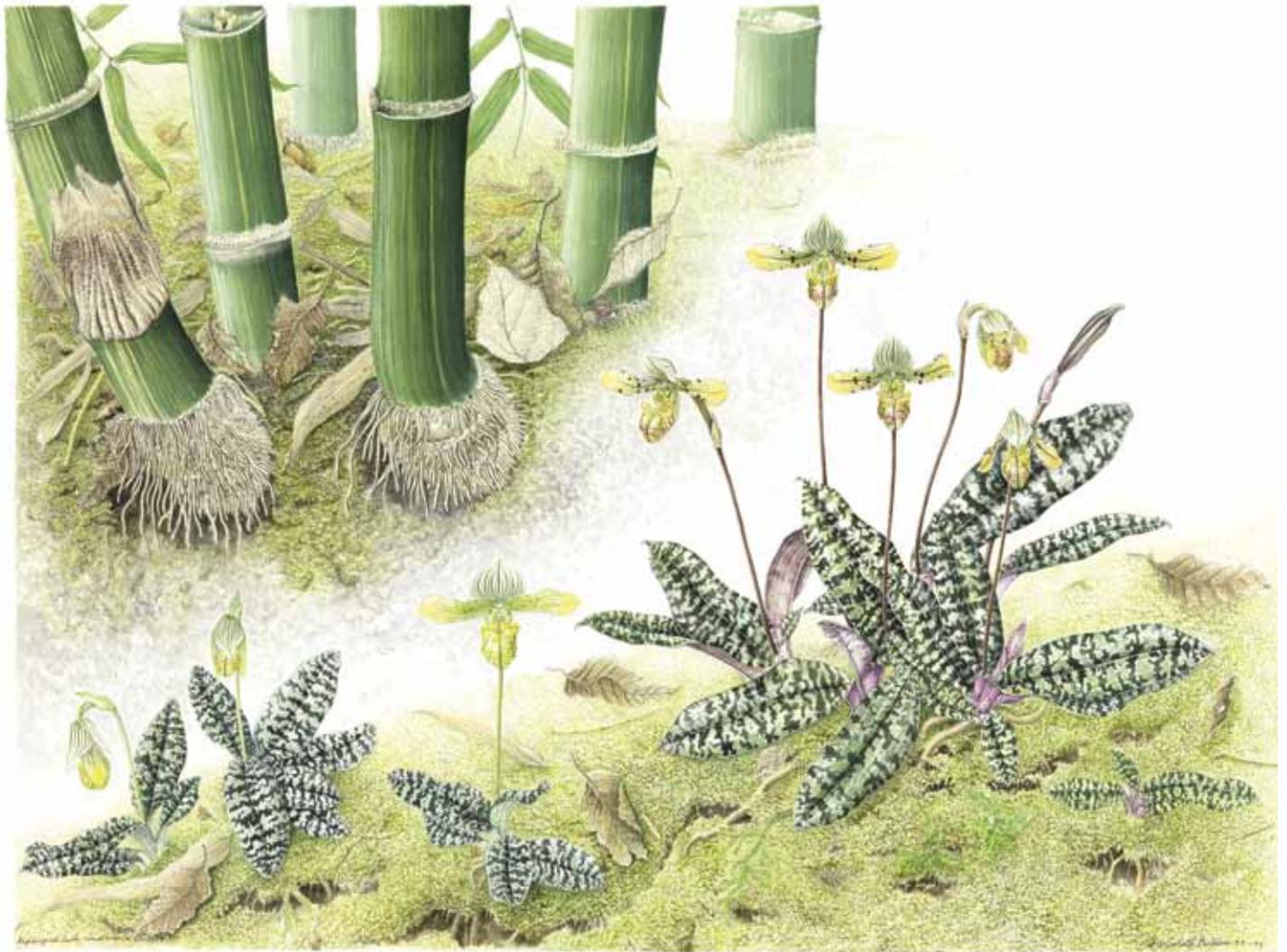
Making stakeholder involvement count

The Government of Kerala proposed a Vembanad Kol Eco Development Authority (VEDA) for the conservation of Vembanad and sustainable use of the wetland resources using

legal mechanisms, and with active coordination with all its stakeholders. However, representation on the proposed structure was limited to senior bureaucrats. As VEDA's mandate clearly stated consultation with stakeholders, ATREE organised a consultative workshop with the three tier panchayats and municipalities on democratic governance for Vembanad.

This one-day workshop was held in August at Alleppey. Participants of the workshop analyzed rules and regulations, including Coastal Regulation Zone (CRZ) notification 2011, Wetlands (Conservation and Management) Rules 2010, The Kerala Conservation of Paddy Land and Wetland Act, 2008, as would be applicable to Vembanad and VEDA. On the basis of this discussion, participants recommended that the state government conduct consultations at the field level, to consolidate the views of all concerned, before finalizing the structure and functions of VEDA; and that there be adequate representation of primary stakeholders and panchayat leaders of the area for planning, developing and managing the Vembanad lake. The resolution was shared with the Chief Minister of Kerala.





outreach

2011 TN Khoshoo Memorial Awards and Lecture



The 2011 TN Khoshoo Memorial Lecture was delivered by the late Nobel laureate, Dr Elinor Ostrom, who determined that the complexity of ecological systems demanded 'a variety of arrangements for governance and management' to effectively and sustainably manage resources, instead of the one-size-fit-all generic management practices being implemented today. Her lecture, 'Challenges for Achieving Conservation and Development', focused on the idea that understanding people and the ecologies they impact is necessary to ensuring long-term sustainability and that this overall process requires

academics, public officials, private firms, and citizens to collaborate. Dr Ostrom shared a framework for the analysis of Social Ecological Systems (SESS) that provide a general language related to major factors affecting resources over time.

Among practical instances of how and when user-managed governance scenarios may work more cooperatively than predicted by standard theories, Dr Ostrom used the example of Bengaluru's lakes. To understand the differences in the quality of the city's lakes, ATREE Ramanujam Fellow, Dr Harini Nagendra has been working

with Dr Ostrom, using her multi-variable socio-ecological framework to arrive at scenarios which promote better governance from combined—community, government and other stakeholder-efforts.

This year's TN Khoshoo Memorial Awards celebrated the work of Hemlata Pradhan, who has documented wild flora of the northeast in meticulously illustrated form, and Sandeep Tambe, who has implemented community-led projects on sustainability and governance of common property resources, in his capacity as a government administrative official.



Hemlata Pradhan was awarded the TN Khoshoo Memorial Award for her efforts in conserving endangered orchids and other Indian plants, with an aim to draw attention to conservation efforts regarding this, and bring awareness to 'what we are unwittingly losing'. Her works are displayed in the Royal Botanic Gardens located in Kew, England.

Dr Sandeep Tambe received the award for his efforts in sustainability in Sikkim. These range from improving efficiency in the management of government projects related to livelihood security, to biodiversity conservation, to addressing rural water scarcity through action on revival of local water bodies. Dr Tambe

has also been instrumental in making Sikkim one of the most successful states in implementing the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA).

This year, the TN Khoshoo Ecology and Environment Award for Schools honoured its first awardees: KK English High School (first prize) and Sri Vani Education Centre (second prize) from Bengaluru; and Salwan Public School (first prize) and Father Agnel School (second prize) from Delhi. The school awards were conceived and launched with the help of partners Pravah (New Delhi), The Teacher Foundation, FRLHT, and Wipro.

From 2012, the Khoshoo school awards will enter into a new partnership—with Wipro Earthian. The Earthian is a pan India sustainability award for schools and colleges. Given that the TN Khoshoo award for schools and Wipro's Earthian award share similar goals, the TN Khoshoo Ecology and Environment Award for Schools will now be called the TN Khoshoo–Earthian Trophy. The distinguishing criteria for the TN Khoshoo–Earthian Trophy will be the feasibility, practical implementability and contextual understanding of the ideas on submitted. ATREE hopes to be able to increase its reach to educational institutions manifold with this partnership.

publications

Research articles

Atkore, V. M., K. Sivakumar and A. J. T. Johnsingh.

2011. Patterns of diversity and conservation status of freshwater fishes in the tributaries of Ramganga river, in the Shiwaliks of the Western Himalaya. *Current Science* 100(5): 731–736.

Caughlin, T. T., T. Ganesh and M.D. Lowman.

2012. Sacred fig trees promote frugivore visitation and tree seedling abundance in South India. *Current Science* 102(6): 918–922.

Chaudhary, P., S. Rai, S. Wangdi, A. Mao, N. Rehman, S. Chettri and K. S. Bawa.

2011. Consistency of local perceptions of climate change in the Kangchenjunga Himalaya landscape. *Current Science* 101(4): 504–513.

Chetana, H. C. and T. Ganesh.

2012. Importance of shade trees (*Gravillea robusta*) in the dispersal of forest tree species in managed tea plantations of southern Western Ghats, India. *Journal of Tropical Ecology* 28: 187–197

Chetana, H. C., Siddhartha, K. and T. Ganesh.

2012. Biodiversity regain in abandoned tea plantations. *Current Science* 102(8): 1089–1090.

D'Souza, R. and H. Nagendra.

2011. Changes in public commons as a consequence of urbanization: The Agara lake in Bengaluru, India. *Environmental Management* 47: 840–850.

Ganesan, R.

2011. *Litsea kakkachensis* (Lauraceae)—A new species from Agasthyamalai, Western Ghats, India, *Rheedea* 21: 143–146.

Goswami, R. and T. Ganesh.

2011. Conservation amidst political unrest: the case of Manas National Park, India. *Current Science* 100(4): 445–446.

Harisha, R. P.

2011. Livelihood and potential conservation roles of wild edible herbs. *International Society of Ethnobiology Newsletter* 3(2):1–2

He, K. S., D. Rocchini, M. Neteler and H. Nagendra.

2011. Benefits of hyperspectral remote sensing for tracking plant invasions. *Diversity and Distributions* 17(3): 381–392.

Iyer, M., H. Nagendra and M. B. Rajani

2012. Using satellite imagery and historical maps to investigate the contours of Lalbagh. *Current Science* 102: 507–509.

Seshadri, K. S. and T. Ganesh.

2011. Faunal mortality on roads due to religious tourism across time and space in protected areas: A case study from south India. *Forest Ecology and Management* 262: 1713–1721.

Vinayaka, K. S., R. Siddappa Setty and Y. L. Krishnamurthy.

2011. Utilization of lichens in the Central Western Ghats area of Karnataka, India. *British Lichen Society Bulletin* 109: 57–62.

Kelsey, R. G., G. Joseph and G. M. McWilliams.

2011. Ethanol synthesis by anoxic root segments from five cedar species relates to their habitat attributes but not their known differences in vulnerability to *Phytophthora lateral* root disease. *Canadian Journal of Forest Research* 41(6): 1202–1211.

Krishnakumar, K., A. Ali, B. Pereira and R. Raghavan.

2011. Unregulated aquaculture and invasive alien species: a case study of



the African Catfish *Clarias gariepinus* in Vembanad Lake (Ramsar Wetland), Kerala, India. *Journal of Threatened Taxa* 3 (5): 1737–1744.

Krishnakumar K., F. G. Benno Pereira, and K. V. Radhakrishnan.

2012. *Puntius madhusoodani* (Teleostei: Cyprinidae), a new species of barb from Manimala River, Kerala, South India. *Biosystematica* 5(2): 31–37.

Lele, S.

2011. Re-reading the interdisciplinary mindscape: A response to Redford. *Oryx* 45(3): 331–332.

Lele, S., A. Kothari, Roma, A. Saikia, R. Rebbapragada, V. Kiro and J. Ete.

2011. Misreading the Issues and the Landscape. *Economic and Political Weekly*. 46(22): 107–108.

Lele, S. and A. Kurien.

2011. Interdisciplinary analysis of the environment: Insights from tropical forest research. *Environmental Conservation* 38(2): 211–233.

Lele, S. and T. Jayaraman.

2011. Equity in the context of sustainable development. Note for UN-GSP, Ministry of Environment and Forests, Government of India, New Delhi.

Mathivanan, M. and T. Ganesh.

2011. Rodents in paddyfields—pros and cons of some indigenous ways to control them in the Tirunelveli district, Tamil Nadu. *Small Mammal Mail*: 2(2): 11–12.

Mohana Kumara. P., S. Zuehlke, Priti V, Ramesha B. T., Shweta S, G. Ravikanth, Vasudeva R., Santhoshkumar, T. R., M. Spitteller, Uma Shaanker R.

2012. *Fusarium proliferatum*, an endophytic fungus from *Dysoxylum*

binectariferum Hook.f, produces rohitukine, a chromane alkaloid possessing anti-cancer activity Antonievan Leeuwenhoek *Journal of Microbiology* 101(2):323–329.

Molleman, L., S. Boeve, J. H. D. Wolf, J. G. B. Oostermeijer, S. Devy, and R. Ganesan.

2011. Commercial harvesting and regeneration of epiphytic macrolichen communities in the Western Ghats, India. *Environmental Conservation* 38(3): 334–341.

Mondal, P., and H. Nagendra.

2011. Trends of forest dynamics in tiger landscapes across Asia. *Environmental Management* 48: 781–794.

H. Nagendra and D. Gopal.

2011. Tree diversity, distribution, history and change in urban parks. *Urban Ecosystems* 14: 211–223.

Nagendra, H.

2011. Assessing relatedness and redundancy of forest monitoring and change indicators. *Journal of Environmental Management* 95 (2012): 108–113.

Nagendra, H. and E. Ostrom.

2011. The challenge of forest diagnostics. *Ecology and Society* 16(2): 20.

Nagendra, H. and E. Ostrom.

2012. Polycentric governance of forest resources. *International Journal of the Commons*. Available at <<http://www.thecommonsjournal.org/index.php/ijc/article/view/321/270>>.

Nagendra, H., S. Nagendran, S. Paul and S. Pareeth.

2012. Graying, greening and fragmentation in the rapidly expanding Indian city of Bengaluru. *Landscape and Urban Planning* 105: 400–406.

- Nagendra, H.**
2012. Assessing relatedness and redundancy of forest monitoring and change indicators. *Journal of Environmental Management* 95: 108–113.
- Narayanan K. S., and P. D. Rajan.**
Dung beetles of Karnataka (Coleoptera: Scarabaeidae Scarabaeinae: Coleoptera) (In Press).
- Patil, S., P. Reidsma, P. Shah, S. Purushothaman S. and W. Joost.**
2012. Comparing conventional and organic agriculture in Karnataka, India: Where and when can organic farming be sustainable? *Land Use Policy*. doi:10.1016/j.landusepol.2012.01.006.
- K. D. Prathapan, and P. D. Rajan.**
2011. Biological diversity: A Common Heritage. *Economic & Political Weekly*, XLVI (14): 15–17.
- Purushothaman, S. and R. Abraham.**
2011. Scaling up and Sustainability: the experience of rural India. *Sustainability in Debate*. 2(2):21–42.
- Purushotham, C. B., K. Dharmadhikari and R. Vivek.**
2011. A comparison of hill stream anuran diversity across two habitats in Kalakad-Mundanthurai Tiger Reserve: a pilot study. *Frogleg* 15: 2–9.
- Purushothaman, S., S. Patil, and I. Francis.**
2012. Impact of policies favouring organic inputs on small farms in Karnataka, India: Amulticriteria approach. *Environment, Development and Sustainability* 14(4): 507–527.
- R. Vivek and T. Ganesh.**
2011. Birding high: Ornithological studies in the canopy. *What's up?* 17(2): 2–3
- Raghavan, R., et al.**
Is the Deccan Mahseer, Tor khudree (Sykes, 1839) (Pisces: Cyprinidae) Is fishery in the Western Ghats hotspot sustainable? A participatory approach to stock assessment. *Fisheries Research* 110(1): 29–38.
- Raghavan, R., N. Dahanukar, K. Krishnakumar, A. Ali, S. Solomon, M. R. Ramprasanth, F. Baby, B. Pereira, J. Tharian and S. Philip.**
2012. Western Ghats' fish fauna in peril: Are pseudo conservationist attitudes to be blamed? *Current Science* Vol. 102 (6): 835–837
- Rajkamal, G. and T. Ganesh.**
2011. Conservation amidst political unrest: the case of Manas National Park, India conflicts. *Current Science* 100: 445–446.
- Ramesha, B. T., J. Gertsch, G. Ravikanth, V. Priti, K. N. Ganeshaiyah and R. Uma Shaanker.**
2011. Biodiversity and chemodiversity: Future perspectives in bioprospecting. *Current Drug Targets*. 1:1515–1530.
- Ramesha, B. T., M. D. Yetish, G. Ravikanth, K. N. Ganeshaiyah, J. Gazoul and R. Uma Shaanker.**
2011. Stylish lengths: Mate choice in flowers. *Journal of Bioscience* 36(2): 229–234.
- Ramesha, B. T., S. Zuehlke, R. C. Vijay, V. Priti, G. Ravikanth, K. N. Ganeshaiyah, M. Spiteller and R. Uma Shaanker.**
2011. Sequestration of camptothecin, an anticancer alkaloid, by chrysomelid beetles. *Journal of Chemical Ecology* 37(5): 533–536.
- Ravikanth G., R. Srirama, K. N. Ganeshaiyah and R. Uma Shaanker.**
2011. In pursuit of a universal barcode of plants: peril of followers? *Current Science* 101(3):269–271.
- Ray, A., Sumangala R. C., G. Ravikanth, Uma Shaanker R. and S. Quader.**
2012. Isolation and characterization of polymorphic microsatellite loci from invasive plant *Lantana camara*. *L. Conservation Genetic Resources* 4(1): 171–173.
- Reidsma, P., H. König, S. Feng, I. Bezlepkina, I. Nesheim, M. Bonin, M. Sghaier, S. Purushothaman, S. Sieber, M. K. van Ittersum and F. Brouwer.**
2011. Methods and tools for integrated assessment of land use policies on sustainable development in developing countries. *Land Use Policy* 28(3): 604–617.
- Rocchini, D., L. Delucchi, G. Bacaro, P. Cavallini, H. Feilhauer, G. M. Foody, K. S. He, H. Nagendra, C. Porta, C. Ricotta, S. Schmidtlein, L. D. Spano, M. Wegmann, M. Neteler.**
Measuring landscape heterogeneity by remotely-sensed spectral diversity in an open source space. *Ecological Informatics* doi10.1016/j.ecoinf.2012.04.002.
- Rocchini, D., G. M. Foody, H. Nagendra, C. Ricotta, M. Anand, K. S. He, V. Amici, B. Kleinschmit, M. Förster, S. Schmidtlein, H. Feilhauer, A. Ghisla, M. Metz, M. Neteler.**
Uncertainty in ecosystem mapping by remote sensing. *Computers and Geosciences* doi10.1016/j.cageo.2012.05.022.
- Seshadri, K. S., A. Vivek Chandran and K. V. Gururaja.**
2012. Anurans from wetlands of Puducherry, along the East Coast of India. *Check List* 8(1): 023–026.
- Seshadri, K. S. and T. Ganesh.**
2011. Sacrifice under wheels: Mortality on roads due to religious tourism in protected areas of south India. *Forest Ecology and Management*: 262: 1713–1721.
- Setty S.**
Subject editor: A report on some macrolichens new to Karnataka, India, K. S. Vinayaka, S. Nayaka,

Y. L. Krishnamurthy. 2012. *Journal of Threatened Taxa* 4(1): 2318–1321

Sharma, M. V., and K. R. Shivanna. 2011. Pollinators, pollination efficiency and fruiting success in a wild nutmeg, *Myristica dactyloides*. *Journal of Tropical Ecology* 27: 405–412.

Shivanna, K. R. 2011. Pollen pistil interaction: A complex mating game required for fertilization in flowering plants. *Journal of Palynology*. 46: 97–120.

Southworth, J., H. Nagendra and L. Cassidy. 2011. Forest transition pathways in Asia - studies from Nepal, India, Thailand, and Cambodia. *Journal of Land Use Science* 1–15.

Srirama R., H. B. Deepak, U. Senthilkumar, G. Ravikanth, B. R. Gurumurthy, M. B. Shivanna, C. V. Chandrasekaran, A. Agarwal, R. Uma Shaanker Hepatoprotective activity of Indian *Phyllanthus*. *L. Pharmaceutical Biology* doi: 10.3109/13880209.2011.649858.

Sundaram B., and A. J. Hiremath. 2011. *Lantana camara* invasion in a heterogeneous landscape: Patterns of spread and correlation with changes in native vegetation. *Biological Invasions* 14(6): 1127–1141.

V. Deepak, M. Ramesh, S. Bhupathy and K. Vasudevan. 2011. *Indotestudo travancorica* (Boulenger 1907) – Travancore Tortoise. Conservation Biology of freshwater turtles and tortoises. *Chelonian Research Monographs* No. 5:054.1–054.6

Vira, B., B. Adams, C. Agarwal, S. Badiger, R. Hope, J. Krishnaswamy and C. Kumar. 2012. Negotiating tradeoffs: Making informed choices about ecosystem services

for poverty alleviation. *Economic and Political Weekly*. 97(9): 67–75.

Vivek, R., Agarwal, P. R., Sreekar, R. 2011. Dusky striped squirrel *Funambulus sublineatus* as a part of mixed-species bird flocks. *Indian BIRDS* 7 (2): 51.

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Books, book chapters, edited books

Acharya, B. B., A. J. T. Johnsingh, et al. 2010. Dhole telemetry studies in Pench Tiger Reserve, Central India. In: *Telemetry in wildlife science – ENVIS Bulletin: Wildlife & Protected Areas*. 13(1): 69–79. (eds) K. Sivakumar and B. Habib. Dehradun: Wildlife Institute of India

Devy, M. S., Ganesh, T. and A. Tripathy. 2011. *Forest canopies of south Asia – a glimpse*. Bengaluru: ATREE.

P. D. Rajan. 2011. Hiding amidst the canopy. In: *Forest canopies of South Asia – a glimpse*. (eds) M. S. Devy, T. Ganesh and A. Tripathy. pp. 36–37. Bengaluru: ATREE.

Ganesan, R. 2010. In search of epiphytes- Did access to canopy matter? In: *Forest canopies of south Asia – a glimpse*. (eds) M. S. Devy, T. Ganesh and A. Tripathy. Bengaluru: ATREE.

Kuriakose, G., R. Ganesan and M. Soubadra Devy. 2011. Mistletoes in the wet forests canopies: Friends or foes. In: *Forest canopies of south Asia – a glimpse*. (eds) M. S. Devy, T. Ganesh and A. Tripathy. Bengaluru: ATREE.

Lele, S. 2011. Climate change and the Indian

environmental movement. In: *A handbook of climate change and India*. (ed) N. Dubash, pp. 208–217. New Delhi: Oxford University Press.

Lele, S., I. Patil, S. Badiger, A. Menon and R. Kumar. 2011. Forests, hydrological services, and agricultural income: A case study from Mysore district of the Western Ghats of India. In: *Environmental valuation in South Asia*. (eds) A. K. E. Haque, M. N. Murty and P. Shyamsundar. pp. 141–169. Cambridge, U.K.: Cambridge University Press.

Molleman, L., S. Boeve, J. Wolf, G. Oostermeijer, M. S. Devy and R. Ganesan. 2011. The spice from the forest canopies. In: *Forest canopies of south Asia – a glimpse*. (eds) M. S. Devy, T. Ganesh and A. Tripathy. Bengaluru: ATREE.

Mrugank V. Prabhu, R. Ganesan, P. D. Rajan and M. Soubadra Devy. 2011. Epiphytic root mats: The insect adobe. In: *Forest canopies of south Asia – a glimpse*. (eds) M. S. Devy, T. Ganesh and A. Tripathy. pp. 41–42. Bengaluru: ATREE.

Muriel, B., Coudel, E., Cisse, Y., Feng, S., Ounalli, N., Purushothaman, S., Rodrigues Filho, S., Sghaier, M., Tonneau, J. P. and Xiaoping, S. 2012. Comparing land use policies in emerging and developing countries. In: *Land Use Policies for Sustainable Development: Exploring integrated assessment tools*. (eds) Floor, B., McNeill, D. and Nishiemi, I. Cheltenham: Edward Elgar Publishing.

Purushothaman, S., Patil, S., and Kashyap, S. 2012. Agrarian crisis and policy links: A framework for Karnataka, India. In: *Land Use Policies for Sustainable Development: Exploring integrated assessment tools*. (eds) Floor, B, Mc Neil,

D and Nishiem, I. Cheltenham: Edward Elgar Publishing.

Ravikanth, G, Srirama R, Senthilkumar U, Ganeshiah K. N. and Uma Shaanker R. 2011. Genetic resources of *Phyllanthus* in Southern India—Identification of geographic and genetic hot-spots and its implication for conservation In: *Phyllanthus species: scientific evaluation and medicinal applications*. (eds) Ramadasan Kuttan and K. B. Harikumar. pp: 97–118. Florida: CRC Press, Taylor & Francis

Seshadri K .S., R. Ganesan and M. Soubadra Devy. Little plants and their treetop toeholds. In: *Forest canopies of south Asia— a glimpse*. (eds) M. S. Devy, T. Ganesh and A. Tripathy. Bengaluru: ATREE.

R. Vivek. 2011. Treetop treks: Ladders and beyond. In: *Forest canopies of south Asia— a glimpse*. (eds) M. S. Devy, T. Ganesh and A. Tripathy. Bengaluru: ATREE.

R. Vivek and Ganesh, T. 2012. Eye-to-eye with birds and small mammals. In: *Forest canopies of south Asia— a glimpse*. (eds) M. S. Devy, T. Ganesh and A. Tripathy. Bengaluru: ATREE.

Krishnagopal, A. and R. Vivek. 2012. Getting `high` in the canopies. In: *Forest canopies of south Asia— a glimpse*. (eds) M. S. Devy, T. Ganesh and A. Tripathy. Bengaluru: ATREE

.....

Reports

H. Nagendra. 2011. *Heterogeneity and collective action for forest management*. Human Development Research Paper 2011/02, United Nations Development Programme

Human Development Reports, November 2011.

H. Nagendra. 2011. *Urban green belts in the twenty-first century*. Landscape Research 36: 706–708.

Lele, S. and T. Jayaraman. 2011. *Equity in the context of sustainable development*. Note for UN-GSP, Ministry of Environment & Forests, Government of India, New Delhi.

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Popular press

Abhisheka K., Aravind N. A., Ganesh T. Learn to Value and Conserve. The New Indian Express. 11 April 2011.

Abhisheka K., Aravind N. A., Ganesh T. Of the hunter and the hunted. Deccan Herald. 19 April 2011.

Balaji, P. and S. Krishnan. History Matters. Down to Earth. May 2011.

Gupta, A. and N. Kakati. Community engagement for conservation in Kaziranga National Park. The Rhino. Journal of Kaziranga Wildlife Society Vol 17. 2011

Hiremath, A. *Alien species - Can they be stopped?* In: The Hindu Survey of the Environment 2011.

Lele, S. Rethinking forest governance: Towards a perspective beyond JFM, the Godavarman case and FRA. In: The Hindu Survey of the Environment 2011.

Lele, S. Thinking about and responding to Climate Change: How and why should we care? Teacher Plus, Sustainability Special: 9 (11): 30–34. 2011

Nagendra, H. Academicians slam Bengaluru’s road widening. Citizen Matters. 15 July 2011.

Nagendra, H. An eye on the forests. Deccan Herald, June 2011.

Nagendra, H. Green were the citizens? Citizen Matters. 7 July 2011.

Rai, N. Looking beyond Protected Areas to save species. In: The Hindu Survey of the Environment 2011.

awards & recognitions

ATREE, in collaboration with Nature Conservation Foundation and Wildlife Institute of India, provided the scientific basis that enabled the Ministry of Environment and Forests (MoEF), New Delhi to propose World Natural Heritage site clusters in the Western Ghats. UNESCO has recognised 39 cluster sites in the Western Ghats as World Natural Heritage Sites. Dr Jagdish Krishnaswamy, Senior Fellow, serves as a member in the Western Ghats Natural Heritage Management Committee of the MoEF, GOI.

ATREE's Director was member of the Working Group on Ecosystem Resilience, Biodiversity and Sustainable Livelihoods for the Twelfth Five-year Planning Commission, Environment and Forest Division, and Steering Committee, Environment, Forests and Wildlife and Animal Welfare.

Dr Gladwin Joseph, Director, ATREE, also serves as a member in the Research Advisory Group (RAG) of Indian Council of Forestry Research and Education (ICFRE), IWST.

Dr Harini Nagendra has joined the Scientific Steering Committee of the Global Land Project (<http://www.globallandproject.org/>) and the Scientific Committee of DIVERSITAS, for a three-year term, beginning January 2012. She finds this an opportunity to shape a focus on issues of interest, including urban monitoring, and greater consideration of the social-institutional linkages, especially in South Asia.

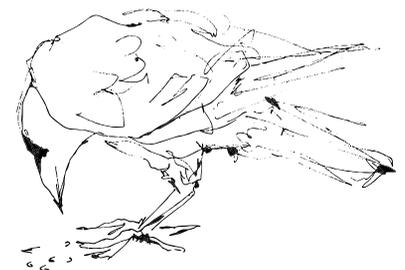
Dr Sharachchandra Lele, Senior Fellow, ATREE, has been appointed member of the Karnataka Elephant Task Force, constituted by the Karnataka High Court, to study the man-elephant conflict in the state. The members are expected to make recommendations for effective conservation and management regime for the pachyderm and its habitat, particularly in the Kodagu-Hassan belt.

Dr Lele has also been elected to Board of International Society for Ecological Economics.

Dr Priyadarsanan Dharma Rajan was elected member of Fresh Water Working Group (FWWG 2011-12) of Society for Conservation Biology.

Dr Latha Bhaskar was nominated to the working group for the formulation of state level strategy for climate change, Kerala.

Seena Karimbumkara and **Dr Chitra Ravi**, both Senior Research Associates with ATREE's Insect Lab and Ecoinformatics Lab, respectively, have been selected as 2012 Encyclopedia of Life (EOL) Rubenstein Fellows. The EOL Rubenstein Fellows programme supports research committed to online collaboration and outreach.





invited talks/ presentations

Lele, S.

2011. REDD+: Dense forest ahead. South Asia Media Briefing Workshop on Climate Change. Centre for Science and Environment. 16 Nov 2011, Delhi.

Lele, S.

2011. Understanding REDD+ and GIM. Workshop on Voices of the vulnerable: Speaking climate change and development to Durban and beyond. Organised by Indian Network on Ethics in Climate Change. 15 Nov 2011, Bengaluru.

Lele, S.

2011. Keynote address. Sustainability assessment and EIA. Azim Premji University. 9 Nov 2011, Bengaluru.

Lele, S.

2011. Ecological economics as an

interdisciplinary framework: Strengths and limitations. Panel discussion on power and culture in ecological economics in 6th INSEE Biennial Conference on Nature, Economy and Society. Indian Society for Ecological Economics. 22 Oct 2011, Hyderabad.

Lele, S.

2011. TEEB India: Concerns, gaps, and way forward. At National Workshop on The Economics of Ecosystems and Biodiversity (TEEB)–India Study. Organised by Ministry of Environment and Forests and Indian Institute of Forest Management. Bhopal. 15–16 September 2011.

Lele, S.

2011. Interdisciplinarity in environmental research: Or how the

social is intertwined with the technical. Indian Institute of Technology, Mumbai. 19 July 2011.

Lele, S.

2011. Forest hydrological services and socio-economic impacts: Insights from the Western Ghats. Invited lecture at Centre for Technology Alternatives for Rural Areas (CTARA), Indian Institute of Technology, Mumbai. 19 July 2011.

Lele, S.

2011. India's carbon sink policy. At Southern Regional Workshop on Climate Change organized by Tata Institute of Social Sciences, Delhi Science Forum and All India People's Science Network. Hosur, Tamil Nadu. 7 July 2011.

Nagendra, H.

T.S. Narayana Rao Memorial Lecture on Urban Ecology – Challenges of Urban Conservation in Bengaluru. 27th National Convention of Architectural Engineers, Indian Institution of Engineers, Bengaluru, 6 March 2012.

Nagendra, H.

Urban Green Spaces of Bengaluru – Biodiversity and Ecosystem Services. Centre for the study of Sustainable Transport, infrastructure and Urban Planning (CiSTUP), Indian Institute of Science, Bengaluru, 10 January 2012.

Purushothaman, S.

Land use regulations for poverty reduction – insights from forest peripheries of Western Ghats. For Western Ghats Ecology Experts Panel, CES. March 2011.

Purushothaman, S.

Linking science and farmers' expertise with agricultural policies: towards a framework for emerging economies. With Sheetal Patil and Ierene Francis. Poster at 'Planet under Pressure' conference, DIVERSITAS, London. March 2012.

Purushothaman, S.

Implications of trends in Access, Benefits and Status of Common Lands in Karnataka. With Lele, S. International Conference on Public Policy and Management, IIM Bengaluru. Dec 2011.

Ravikanth, G.

Ecological niche modelling in agriculture, health and forestry. School of Bio Sciences and Technology (SBST), VIT University, Vellore. 7 April, 2011.

Ravikanth, G.

Prospecting for natural products using ENM. At a three-day workshop

on products from natural resources: Prospecting and utilization. Vellore Institute of Technology, Vellore. 27 to 29th July 2011.

Siddappa Setty R.

Television Discussion. Forest Fire at Nagarhole National Park. On Udaya News, 1 March 2012.

Siddappa Setty R.

Sustainable harvest of non-timber forest products in South India at national seminar on Sustainable Forests of Western Ghats: Prospects and Challenges. Solapur University, Solapur. 10–11 February 2012. Sustainable harvest of non-timber forest products and livelihood. At international consultation on 20 Years of Rio: Biodiversity – Development – Livelihoods. MSSRF, Chennai. 15–17 February 2012.

Siddappa Setty R.

Gave ten talks on Environment and sustainable use of natural resources. For Gram Panchayat representatives of Hasan, Tumkur, Udupi, Raichur, Koppal, Davanagere and Haveri district

at Mahatma Gandhi Institute of Rural Energy and Development, from October to December 2011.

Siddappa Setty R.

Forest Right Act and conservation. Workshop on Property Rights and Development organised by Liberty Institute in association with SUGRAMA for elected women of Grama Panchayat. 16 Nov 2011.

Thomas, Samuel

The politics of water development: A case study of Darjeeling's water crisis. Workshop on water justice issues in South Asia, organized by Wageningen University (WUR), Society for Promoting Participative Ecosystem Management (SOPPECOM) and the FORUM for Policy Dialogue on Water Conflicts in India. Pune. 18–21 April 2011.



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The conservation of species, landscapes and biodiversity is the central theme that drives my research interests. However, given the increasing lack of natural areas free from human-impact, I focus not just on conservation in natural systems, but also in human-modified and human-dominated landscapes. Much of my work involves the study of mammalian carnivores, and in particular, meso-carnivores. In general, carnivores exist at relatively low numbers and yet

can dramatically influence animal and plant communities. Thus, by studying carnivores, we can gain insight into the importance of the individual within natural systems. However, I am by no means restricted to carnivores or even mammals in my research programme.

Some of my major research themes include: the role of carnivores in structuring species assemblages; human-subsidised carnivores and their interactions with wildlife at multiple levels, viz. as predators; competitors and vectors of pathogens; disease ecology of carnivores; conservation of dry grassland and semi-arid ecosystems in India and their associated faunal elements, in particular the Indian bustard, Indian fox and Indian wolf; human-wildlife conflict outside protected areas; movement ecology and resource selection of animals.

Priyanka Jamwal



My core interests lie in the area of Water Management. My doctoral and postdoctoral work primarily focused on the issues related to water quality. During my doctoral work I investigated

and analyzed the factors affecting the microbial load in surface waters and helped quantify the microbial load from various sources of pollution in Delhi. My postdoctoral work centred around the groundwater quality issues in rural watersheds by analyzing the fate and transport of nitrates in groundwater. At ATREE, I am working on the factors responsible for contamination of water distribution networks and plan to develop a model for prediction of fecal coliform levels in water distribution networks after the occurrence of a contamination episode. Along with this I am also working in the field of climate change and its impact on surface and groundwater quality in rapidly urbanizing watersheds.

Sarala Khaling



I was trained as a wildlife biologist/ zoologist but I have been interested in the conservation-development interface. While hard core research is of interest to me, I have been a practitioner for more than a decade and I believe that any research I contribute to should always have an action component. My interests are landscape level studies and planning,

conservation-livelihoods, institutions, gender and equity issues. From a programme perspective my interests lie in monitoring and evaluation systems and processes, organisational learning and adaptive management.

Sumit Sen



The overarching goal of my research is in the area of land and water resources management. I enjoy conducting applied research integrating hydrologic monitoring and modeling at various scales. Specifically, I am interested in watershed management and water quality monitoring and modeling, surface and subsurface water hydrology, impact of climate variability on water resources, and limnology. I am also interested in understanding the biophysical linkages between climate variability and changes in water quantity and quality.

.....

STAFF AND STUDENTS

Faculty

Dr Abi Vanak Tamak
Fellow, from Jan 2012

Dr Ankila Hiremath
Fellow
Co-programme leader – Ecosystems and Global Change

Dr Ashokankur Datta
Fellow till October 2011

Dr Bejoy K. Thomas
Fellow

Dr G. Ravikanth
Fellow

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Senior Fellow
Convenor, Academy for Conservation Science and Sustainability Studies

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Programme Leader – Ecosystem Services and Human Well-being

Dr M. Soubadra Devy
Fellow

Dr N. A. Aravind
Fellow
Coordinator – Academy for Conservation Science and Sustainability Studies till December 2011

Dr Nitin Rai
Fellow

Dr Priyadarsanan Dharma Rajan
Senior Fellow
Programme Leader – Ecosystems and
Global Change

Dr Priyanka Jamwal
Fellow, *from April 2012*

Dr R. Ganesan
Fellow

Dr Seema Purushothaman
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Senior Fellow
Convenor – Centre for Environment and
Development
Programme Leader – Forests and
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Programme Leader – Land, Water
and Livelihoods

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Dr Siddhartha Krishnan
Fellow

Dr Sumit Sen
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Dr Swati Shresth
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Dr T. Ganesh
Senior Fellow

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Director

Mr Sridhar Ramaswamy Iyengar
Deputy Director, Finance and
Administration

Mr Suman K. Rai
Regional Director, North East,
till July 31, 2011

Dr Sarala Khaling
Regional Director, NE, *from August 2011*

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POST DOC FELLOWS

Dr Ozmond Roshan D'Souza
till June 2011

Dr Shijo Joseph
till April 2011

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COORDINATORS

A. Kavitha
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Male Mahadeshwara Hills, also SRA

S. Shiva Subramanya
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Web and Database

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Conservation and Livelihoods, NE,
till August 2011

.....

SENIOR RESEARCH ASSOCIATES

Abhisheka K.
Allwin Jesudasan
Biju Abraham, till July 2011

Chitra Ravi
**C. Made Gowda, also Assistant Field
Coordinator, Community-based
Conservation Centre, Biligiri Rangaswamy
Temple**

Ierene Francis, till March 2012
Jagadish M R, Senior Research Fellow*

K. N. Rakesh

M. B. Prashanth

Patrick David, till 15 May 2011

Prasanna J Kolte

Priti Gururaja, Senior Research Fellow*

Purnima Ashok Kumar, till Dec 2011

Rosa Abraham

Sheetal Patil

Somajita Paul, also PhD student, 2008

.....

RESEARCH ASSOCIATES

A. Aneesh, *till April 2012*
A. Saravanan
Aditya Bhaskaran, *till July 2011*
Anamika Kumari, *till August 2011*
Bishwarupa Sahu, *joined Jan 2012*
B. Vadivel, *till July 2011*
B. R. Kailash
Chirag Rai, **Junior Research Fellow**, *March 2012 **
C. D. Nandita, *till Sep 2011*
Dhavamani, *till May 2011**
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Manish Kumar*
Manjila Sharma*
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P. Nagendra, *till Oct 2011*
P. R. Nikesh*
Parabita Basu
Pranita Sambhus
R. C. Sumangala
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Sabah Rubina, *till Feb 2012*
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Senthil Kumar*
Shruthi Jayappa, *till Feb 2012*
Shweta Basnett*
Sreerupa Sen
Suchismita Das *till July 2011*

Yangchenla Bhutia*
Shivani Agarwal, *July 2011*

**These positions are funded as Junior Research Fellows or Senior Research Fellows under DBT and DST project grants.*

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Krishna Kumar
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Akai Mao,
till August 2011, NE
Dr Latha Bhaskar
till Oct 2011
 Project Coordinator, Vembanad Community Environmental Resource Centre
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M. Mathivanan
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 Small Grants Assistant, CEPF-ATREE
Arunava Gupta
 Project Associate, Assam

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Anjali
 Receptionist
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 Accounts Executive
B. Obaiah
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Dheeksha Rabindra
till June 2011
 Communication Officer
G. Hemalatha
 Administrative Secretary
Gangarathna
 Asst. Cook and Housekeeper
H. Usha
 Secretary



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till June 2011
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Managing Editor, Conservation
and Society

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Office Assistant

R. Raghu
Office Assistant

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Administration and Liaison Officer

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S. Anand
till July 2011
Administration and Grants Manager

T. K. Ganesha
till April 2011
Assistant Office Manager

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Finance and Accounts Manager

Tilotama Thapa
Administration and Finance
Coordinator

Vartika Saxena
Accountant

Vijay Kullu
Accounts Executive

Y. M. Rohini
Accountant

Yeshey Namgyal
till Dec 2011
Administrative Officer

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FIELD SUPPORT

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Driver

Arjun Rai
till March 2011
Field Assistant

Bhabananda Roy
Field Assistant

D. Rajanna
Field Station Caretaker

D. S. Kumar
till July 2011
Research Assistant

H. M. Krishnan
till October 2011
Research Assistant

Jadeswamy
Driver

Jadeya
Field Assistant

Javana
till December 2011
Senior Field Assistant

Jayamala
Housekeeper

K. Sunitha
Housekeeper/Attender

K. A. Kishore
till March 2012
Research Assistant

Karma Dorjee
Office Executive

Kumbha
Senior Field Assistant

Lakshmi
Housekeeper

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Field Assistant

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Driver

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Driver

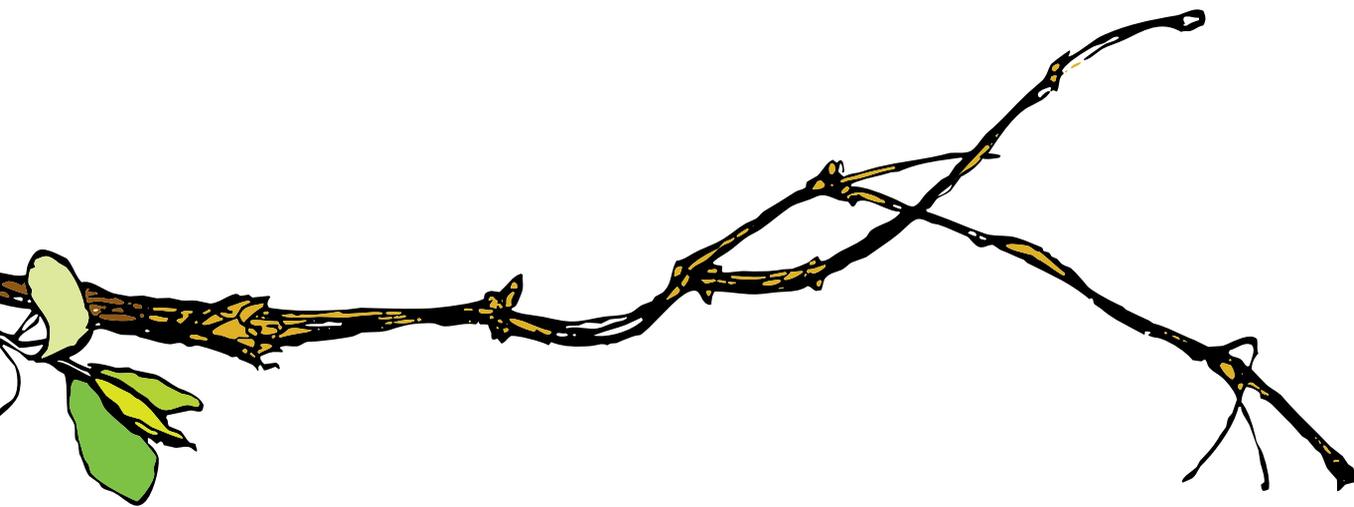
Madesha
Field Assistant

Meena Rajaram
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Narayan
Senior Field Assistant

Narayanamma
Caretaker

Nilmani Rabha
Research Assistant



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Gardener

R. Madeva
Driver

Ramesh Dilpali
Driver

Ravindra Das
Field Assistant

Renukha
Cook

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Senior Field Assistant

Saraswathi
Gardener and Nursery Caretaker

Sheela
Field Assistant

Shivaram
Field Assistant

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Housekeeper

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Field Assistant

Tenzing Sherpa
Field Assistant

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Driver

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Research Assistant

Veeramma
Assistant Cook and Housekeeper

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PH D STUDENTS

Amit John Kurien, 2009

Anand Gazmer, 2008

Anirban Dutta Roy, 2009

Aniruddha Pravin Marathe, 2009

Arundhati Das, 2008

Barkha Subba, 2009

Bharath Sundaram, 2006 *till June 2011*

Chandrima Home, 2009

Dhritiman Das, 2008

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Radhika Kanade, 2009

Rajkamal Goswami, 2007

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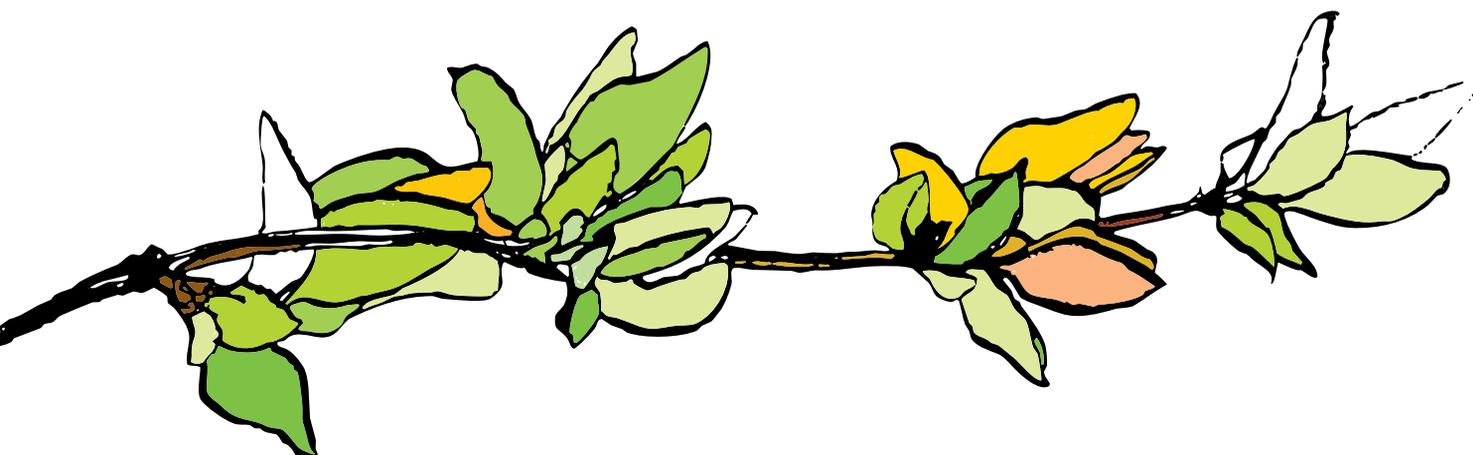


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- ✿ Office of the Field Director, Manas Tiger Project, Assam
- ✿ West Bengal Forest Department, Darjeeling, West Bengal
- ✿ Aaranyak, Guwahati, Assam
- ✿ Agumbe Rainforest Research Station, Agumbe, Karnataka
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- ✿ Madras Crocodile Bank Trust, Mamallapuram, Tamil Nadu
- ✿ MS Swaminathan Research Foundation, Chennai, Tamil Nadu
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- ✿ Prayas, Pune, Maharashtra
- ✿ Primate Research Centre, Guwahati, Assam
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- ✿ Wildlife Conservation Society-India Programme, Bengaluru, Karnataka

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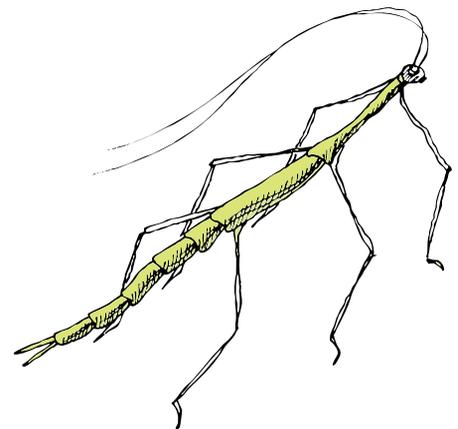
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- ❁ Society for Promoting Participative Ecosystem Management, Pune, Maharashtra
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- ❁ District Collectorate of Alappuzha, Kerala
- ❁ District Forest Officers of Wildlife and Social Forestry, Tirunelveli, Tamil Nadu
- ❁ District Panchayat, Alappuzha, Kerala
- ❁ Ecotourism and Conservation Society of Sikki, Gangtok, Sikkim
- ❁ Educational Multimedia Research Centre, Calicut University, Kerala
- ❁ Khangchendzonga Conservation Committee, Yuksam, Sikkim
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- ❁ Kerala Forest Department, Thiruvananthapuram, Kerala
- ❁ Kerala Municipality, Alappuzha, Kerala
- ❁ Kerala State Biodiversity Board, Thiruvananthapuram, Kerala
- ❁ Kerala State Tourism Promotion Council, Alappuzha, Kerala
- ❁ Kuttanad Development Package Project, Alappuzha, Kerala
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- ❁ National Rural Health Mission, BTAD, Assam
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- ❁ Social Forestry Division, Alappuzha
- ❁ Superintendent of Police, Tirunelveli, Tamil Nadu
- ❁ Tamil Nadu Electricity Board, Chennai, Tamil Nadu
- ❁ Tamil Nadu Electricity Board, Tirunelveli, Tamil Nadu
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- ❁ CGH Earth Group, Alappuzha, Kerala
- ❁ Clam Cooperative Societies, Muhamma, Alappuzha, Kerala
- ❁ Divyajyothi Federation, Male Mahadeshwara Hills, Karnataka
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- ❁ Manas Bhuyanpara Conservation and Ecotourism Society, Baksa, Assam
- ❁ Manas Ever Welfare Society, Baksa, Assam
- ❁ Natundanga Eco-Development Committee, Kaziranga National Park, Assam
- ❁ Ngunu Ziro, Ziro, Arunachal Pradesh
- ❁ Pearl City Nature Society, Thoothukudi
- ❁ Panbari Manas National Park Protection and Ecotourism Society, Chirang, Assam
- ❁ Soliga Abivruddhi Sangha, Yelandur, Kollegal and Chamarajanagara, Karnataka
- ❁ Nature Talkies, Singampatti, Tamil Nadu
- ❁ Act India Foundation, Kodaikanal, Tamil Nadu
- ❁ Action for Community Organisation, Rehabilitation and Development, Gudalur
- ❁ Bengaluru Environment Trust, Bengaluru, Karnataka
- ❁ Biome Conservation Foundation, Pune
- ❁ Centre for Environmental Development, Thiruvananthapuram, Kerala

- ✿ Confederation of Real Estate Developers' Associations of India, Kochi, Kerala
- ✿ Conservation International, USA
- ✿ Covenant Centre for Development, Madurai, Tamil Nadu
- ✿ Darjeeling Association of Social Organisations, Darjeeling, West Bengal
- ✿ Darjeeling Prerna, Darjeeling, West Bengal
- ✿ Diocesan Social Service Society, Imphal, Manipur
- ✿ Dishari, Tripura
- ✿ EcoSystems - India, Guwahati, Assam
- ✿ Ecogreen, Rajapalayam, Tamil Nadu
- ✿ Federation of Societies for Environmental Protection, Darjeeling
- ✿ Foundation for Revitalisation of Local Health and Traditions, Bengaluru, Karnataka
- ✿ Future Generations - Arunachal, Itanagar, Arunachal Pradesh
- ✿ Gandhi Smaraka Seva Samithi, Alappuzha, Kerala
- ✿ Good Shepherd Trust, Kollegal, Karnataka
- ✿ Srinivasan Service Trust, Javadi Hills, Tamil Nadu
- ✿ JungleScapes, Chamarajanagar, Karnataka
- ✿ Green India Trust, Dandeli, Karnataka
- ✿ Himalayan Environmental Studies and Conservation Organization, Dehradun, Uttarakhand
- ✿ International Border Area People's Welfare Organization, Nagaland
- ✿ International Fund for Agricultural Development, Ukhrul, Manipur
- ✿ Junglescapes Charitable Trust, Bengaluru, Karnataka
- ✿ Kalpavriksh, Pune, Maharashtra
- ✿ Kerala Sasthra Sahithya Parishath, Kerala
- ✿ Keystone Foundation, Kotagiri, Tamil Nadu
- ✿ Kodagu Model Forest Trust, Kodagu, Karnataka
- ✿ Kuttanad Vikasana Samithy, Alappuzha, Kerala
- ✿ Maitreya Amar Bazaar Kendriya Samiti, Dhemaji, Assam
- ✿ Nature's Foster, Bongaigaon, Assam
- ✿ Oju Welfare Association, Arunachal Pradesh
- ✿ Organic Ekta, Darjeeling, West Bengal
- ✿ Palni Hills Conservation Council, Kodaikanal, Tamil Nadu
- ✿ People's Action for Rural Transformation, Mizoram
- ✿ Periyar Foundation, Thekkadi, Kerala
- ✿ Priscilla Centre, Guwahati, Assam
- ✿ Rhino Foundation for Nature in NE India, Guwahati, Assam
- ✿ River Research Centre, Thrissur, Kerala
- ✿ Rotary Clubs - Ambasamudram, Tirunelveli, Tamil Nadu
- ✿ Rural Management and Development Department, Government of Sikkim
- ✿ Samavada, Bengaluru, Karnataka
- ✿ Samrakshan Trust, Meghalaya
- ✿ Simang Valley Women's Welfare Organization, Arunachal Pradesh
- ✿ Sisterhood Network, Dimapur, Nagaland
- ✿ Social Development Council, Khangshim, Manipur
- ✿ Socio Economic Unit Foundation, Alappuzha, Kerala
- ✿ Srinivasan Service Trust, Javadi Hills, Tamil Nadu
- ✿ Swami Vivekananda Youth Movement, Saragur, Karnataka
- ✿ Swasam, Ambasamudram, Tirunelveli, Tamil Nadu
- ✿ The Gerry Martin Project, Bengaluru, Karnataka
- ✿ The Mountain Institute, Gangtok, Sikkim
- ✿ Tree Trust, Kallidaikurichi, Tirunelveli, Tamil Nadu
- ✿ Uravu Indigenous Science and Technology Study Centre, Wayanad, Kerala
- ✿ Vanastree - The Malnad Forest Garden and Seedkeepers' Collective, Sirsi, Karnataka
- ✿ Vembanad Nature Club, Alappuzha, Kerala
- ✿ Vivekananda Girijana Kalyana Kendra, Biligiri Rangaswamy Temple Wildlife Sanctuary, Karnataka
- ✿ Voluntary Health Association of Sikkim, Gangtok, Sikkim
- ✿ Wildlife Information Liaison Development (WILD) Society, Coimbatore, Tamil Nadu
- ✿ Wildlife Research and Conservation Society, Pune, Maharashtra
- ✿ Wildlife Trust of India, Guwahati, Assam
- ✿ Winrock International India, New Delhi
- ✿ World Pheasant Association, India, New Delhi
- ✿ World Wildlife Fund-India Programme, Guwahati, Assam
- ✿ WWF-India Sikkim Programme Office, Gangtok, Sikkim
- ✿ WWF Kerala, Thiruvananthapuram, Kerala



donors

We wish to thank the generous contribution from our donors.

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Grants

- ✿ Azim Premji Foundation for Development, Bengaluru, India
- ✿ Conservation International, Virginia, USA
- ✿ Critical Ecosystem Partnership Fund, Virginia, USA
- ✿ Department of Biotechnology, Government of India, New Delhi, India
- ✿ Department of Environment and Climate Change, Kerala, India
- ✿ Department of Science and Technology, Government of India, New Delhi, India

- ✿ Earthwatch Institute, Oxford, UK
- ✿ European Commission, Brussels, Belgium
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- ✿ GE Volunteers Foundation, Connecticut, USA
- ✿ Institute for Global Environment Strategies, Kanagawa, Japan
- ✿ International Centre for Integrated Mountain Development, Kathmandu, Nepal
- ✿ Jamsetji Tata Trust, Mumbai, India
- ✿ Karnataka Biodiversity Board, Bengaluru, India
- ✿ MacArthur Foundation, Chicago, USA
- ✿ Ministry of Earth Sciences, New Delhi, India
- ✿ Ministry of Environment and Forests, Government of India, New Delhi, India
- ✿ National Bank for Agriculture and Rural Development, Karnataka, India
- ✿ National Fish and Wildlife Foundation, Washington DC, USA
- ✿ National Geographic Society, Washington DC, USA
- ✿ Natural Environment Research Council, Swindon, UK

- ✿ Norwegian University of Life Sciences, Norway
- ✿ Rainforest Concern, London, UK
- ✿ Rufford Small Grants Foundation, London, UK
- ✿ SM Sehgal Foundation, Gurgaon, India
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- ✿ South Asian Network for Developmental and Environmental Economics
- ✿ Stockholm Resilience Centre, Stockholm, Sweden
- ✿ Tata Social Welfare Trust, Mumbai, India
- ✿ United Nations Educational, Scientific and Cultural Organisation, New Delhi, India
- ✿ United Nations Foundation, Washington DC, USA
- ✿ University of Cambridge, Cambridge, UK
- ✿ University of East Anglia, Norwich, UK
- ✿ Wipro Limited, Bengaluru, India
- ✿ Wildlife Conservation Society, New York, USA
- ✿ World Bank, Washington DC, USA



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Audit Report

We have audited the attached Balance Sheet of ASHOKA TRUST FOR RESEARCH IN ECOLOGY AND ENVIRONMENT (ATREE) as at 31st March 2012 and Income and Expenditure Account for the year ended on that date hereto. These financial statements are the responsibility of the management of the trust. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with auditing standards generally accepted in India. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by the management as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

Further, we report that:

- (i) We have obtained all information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit;
- (ii) In our opinion, proper books of account have been maintained by the trust, so far as appears from our examination of those books;
- (iii) The Balance Sheet and the Income and Expenditure Account dealt with by this report are in agreement with the books of account;
- (iv) The Balance Sheet and Income and Expenditure Account dealt with by this report comply with the accounting standards applicable to the trust;
- (v) In our opinion and to the best of our information and according to the explanations given to us, the said accounts give a true and fair view in conformity with the accounting principles generally accepted in India;
 - (a) in the case of Balance Sheet, of the state of affairs of the trust as at 31st March 2012.
 - (b) In the case of the Income and Expenditure Account, of the excess of Expenditure over Income for the year ended on 31st March 2012.

Place: Bangalore

Date: 31st July 2012

for G. ANANTHA & Co.
Chartered Accountants
FRN 0051605

Rani N. R.
Partner
M. No. 214318

Balance Sheet as at 31st March 2012

Rupees in lakhs

Application of Funds	As at 31-3-2012		As at 31-3-2011	
Corpus Fund		2,735.49		2,509.49
General Fund		75.70		181.13
Utilized Reserves				
Project Assets		618.04		546.10
ATREE Assets		38.19		
Building Fund		423.38		395.44
Project Fund		1,123.84		825.61
Total		5014.64		4457.77
Application of Funds				
Fixed Assets				
Project Assets		618.04		546.10
ATREE Assets		38.19		36.09
Buildings		423.38		433.07
Investments				
Corpus Investments		2,740.66		2,535.29
Other Investments		940.03		656.15
Current Assets and Liabilities				
Advances	39.16		26.38	
Other Current Assets	8.13		40.29	
Cash and Bank	209.15		187.47	
Gross Current Assets	256.44		254.13	
Less: Current Liabilities	2.10		3.07	
Net Current Assets		254.34		251.07
Total		5014.64		4457.77

Income and Expenditure Account for the year ended 31st March 2012

Rupees in lakhs

Particulars	For the year end 31-03-12	For the year end 31-03-11	
Income			
Project Income	1,070.30		990.32
Donation and Other Income	0.19		0.21
Interest	32.01		24.33
Total	1102.50		1014.86
Expenditure			
Salaries and Staff Cost	477.45		472.63
Travel	77.51		66.72
Project and Operating Expenses			
Project Expenses	502.33	443.28	
Operating Expenses	32.17	28.62	
Total Project and Operating Expenses	534.50		471.90
Depreciation	15.51		10.99
Total	1104.97		1022.24
Surplus/(Deficit)	(2.47)		(7.38)

Photo credits

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clockwise from left

N. A. Aravind, Krishnakumar K.,
Krishnakumar K., N. A. Aravind

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Senthil Kumar U.

Pages 16 and 17

H. C. Chetana

Pages 18 and 19

R. Ganesan

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Ramesh Kannan

Pages 25 and 26

Seema Purushothaman

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Shrinivas Badiger

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far right

Ovee Thorat

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left

Madhushree Munsri

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Ovee Thorat

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Deepthi N., A. Sarvanan

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Suman Rai

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Samuel Thomas

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Samuel Thomas

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Tenzing Ingty

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Samuel Thomas

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Art by Hemlata Pradhan

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ATREE

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Samuel Thomas

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Samuel Thomas

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Sandesh Kadur/Felis Creations

ATREE is recognised 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.

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ATREE Community-based Conservation Centres (Field Academies)

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MM Hills Community-based Conservation Centre

MM Hills Post, Kollegal Taluk
Chamrajanagara District
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Agasthyamalai Community-based Conservation Centre

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Tamil Nadu 627421
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Doddamaralwadi, Kanakpura Taluk
Ramanagara District
Karnataka 562121
Ph: +91 80 23635555 ext. 106

Vembanad Community Environmental Resource Centre

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Visit www.atree.org
to know more about us.

mission statement

"To promote socially just environmental conservation and sustainable development by generating rigorous interdisciplinary knowledge that engages actively with academia, policy makers, practitioners, activists, students and wider public audiences."

