Ashoka Trust for Research in Ecology and the Environment

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In this Issue

ATREE's new investments in climate change research: mitigation strategies and modelling

ATREE has positioned its research on land, water, livelihoods, forests, ecosystem processes and ecosystem services within the broader frames of climate change and governance. With respect to climate change, this has translated into looking at impacts of climate change and extreme weather events, and adaptation and coping strategies. This post hoc approach will now change with ATREE's announcement of a new research programme on climate change, which will have capabilities in climate modelling and mitigation strategies.

Both aspects of climate change research—mitigation, and adaptation—are relevant to India. The question of mitigation is a challenging one for developing countries. The current level of per capita emissions is low, the historical responsibility of this region is also low, and the need for poverty alleviation (and therefore some increases in energy consumption) is high. Conventional development strategies depend upon increasing throughputs of fossil fuels and other mineral resources. The new climate change programme will explore strategies that enable growth and development without compromising the environment.

The climate change programme will build on existing ATREE's work in climate change; and in collaboration with other programmes on Forests and Governance; Land, Water and Livelihoods; Ecosystem Services and Human Wellbeing; and Ecosystems and Global Change. ATREE has advertised faculty positions for *'Renewable energy policy and environmental governance'; 'Urbanization and climate change';* and *'Climate modelling for impact/adaptation research'*. Details are available on *http://www.atree.org/node/1008.* Oak Foundation, Geneva, and the Royal Norwegian Embassy, New Delhi are funding this research.

Dr. Bawa awarded MIDORI Prize for Biodiversity

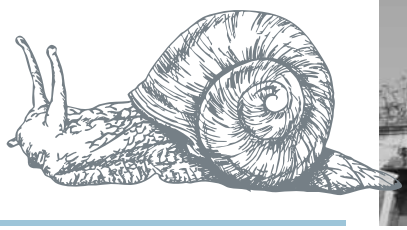
Dr. Kamal Bawa, President, ATREE, received the MIDORI Prize for Biodiversity on October 15 in Pyeongchang, South Korea. The MIDORI Prize is co-hosted by the Secretariat of the Convention on Biological Diversity and the AEON Environmental Foundation, Japan. The award was presented at the meeting of the Conference of Parties (COP-12) to the Convention on Biological Diversity, which was underway in South Korea.

The aims of the MIDORI Prize are to extend the developmental influence of the individual's efforts to various projects relating to biodiversity throughout the world, and to raise awareness about biodiversity. The prize carries a cash award of US$100,000. Dr. Bawa received the MIDORI Prize for his contributions to research

in ecology of tropical forests, sustainable use of tropical forests, climate change in the Himalaya; for promoting engagement of civil society in conservation efforts; and for his leadership role in setting up ATREE.

Environmental awards are a good indicator of what the world perceives as important in the sphere of environment. Ideas of sustainability and inclusiveness, community engagement, governance, reflected, for instance, in the vision of the MIDORI prize, the Gunnerus Award in Sustainability Science (2012, Dr. Bawa), the Elinor Ostrom Award on Collective Governance of the Commons (2013, Harini Nagendra, Adjunct faculty, ATREE) reward the science, as well as ideas of its practical application on the ground.

Dr. Kamaljit Bawa has taught at the University of Massachusetts, Boston for more than 40 years. He founded ATREE in 1996.



Research

Bats and ancient temples in Tamil Nadu

The districts of Tirunelveli and Thoothukudi in south Tamil Nadu are known for the many ancient temples built along the river Tamiraparani. Many of these temples are over 500 years old; some are more than 1,000 years old. Not only are these temples culturally important, they also harbour a significant diversity of life forms, set as they are as islands of comparative non-disturbance in a sea of cultivated landscape—mostly paddy agriculture—which landscape leaves very little natural habitat for biodiversity. The temples, with their trees, gardens *(nandavana)*, complex architecture and general isolation from extreme disturbance have provided a niche for several species to exist in. However, this secluded niche, which provides sanctuary to trees that are 100+ years old and considered sacred, butterflies, birds, reptiles, insects and mammals, is eroding.

In 2012, ATREE initiated a survey to document biodiversity in these temples. The focus was on bats, with support from Bat Conservation International. We surveyed 70 temples; 47 had six species of bats. We counted about 4,300 bats. The most common species was *Hipposideros speoris, Rhinopoma hardwicki* occurring less often; both insectivorous (Microchiropteran) species. These bats were either in abandoned areas in the temple complex, in crevices between stone pillars, or in the corridors surrounding the *sanctum sanctorum*, where the ceiling was high.

In recent years, government and corporate bodies have expressed interest in taking up temple maintenance and renovation. So high-decibel electric drums, public address systems, and extensive lighting of the complex are replacing the drums, chanting of mantras, oil lamps and shallow lighting of the past. The renovators have also incorporated bat preventive measures. So mesh has been placed on towers, crevices have been plastered over, and the stone walls are regularly power washed.

We found that the bats tend to stay on in spite of all this. Almost all species were intolerant to noise; some tolerated light and even minimum levels of maintenance work. What is important is that the bats have some place to move into while temples are renovated or cleaned: an abandoned room in the temple complex, or other temples in the area.

Why should there be bats in temples? First, there are no alternative habitats for bats in the landscape since most rocky areas have been quarried. Second, earlier,

Personal takes

The baby turtle

In coastal Nellore, there's an isolated village with not more than 300 people living there. Lakshmipuram. Usually, back home at Chennai, the beach crowds up during turtle walks. It is not easy to shut down the noise and notice smaller things. This village has so much space.

That night, we were releasing around thirty hatchlings. Twenty nine scuttled away easily in to the sea, but one baby was just so slow. He crawled towards the large flashlight that we used to guide them. Everything was so bright and contrasted under the big flashlight. The light bounced off the sand and lit and shadow-ed every fold on the hatchling. I followed it and studied the formation of scutes on its carapace. Everything so clear and defined. Noiseless.

Suddenly, something moved next to me. A ghost crab. What if it eats the hatchling? I was too scared to let them get close to each other. But, I realized these crabs are not so easy to film and it was only because of the light source behind it that I actually noticed him. I bent down and saw it was holding on to some kind of orange plastic piece. I hope it didn't eat it. The hatchling diligently kept to its pursuit. Dusting off the sand on its eyes with its flippers, it slid on its belly towards the waves. I sat there for some time, just like the baby turtle, my belly on the sand, and watched them.

Rahul Muralidharan joined ATREE as a PhD student in 2013. He wrote this piece on the turtle hatchling after graduation, when he was teaching English and Ecology to primary school children. Rahul calls himself a marine biologist.

How did Rahul arrive at what he is doing now? Rahul says he was deeply drawn to environmental studies and conservation during his five years at Madras Christian College. As an undergraduate he got involved in local sea turtle conservation initiatives, where he worked with fishermen and turtles. To further this interest he decided to take up marine biology for his master's degree in 2009, electing to work on a coastal species of dolphins known as the Indo Pacific humpback dolphin for his thesis. Humpback dolphins occur along the Chennai coast during particular seasons and are frequently sighted by artisanal fishermen. Rahul worked with fishermen to understand the presence and movement patterns of these dolphins. Now, for his PhD, Rahul is looking at humpback dolphin-fishery interactions in the Tamil Nadu coast; focusing on coastal development, fishing technologies, seafood markets and the state's environmental policies.

Rahul Muralidharan publishes in the blogs *http://chaikadai.wordpress.com/* and *http://coastales.blogspot.in/*. The original article is called *'A slow baby turtle and two ghost crabs'* and also features a video of the turtle and ghost crab. You can reach it on *https://chaikadai.wordpress.com/2012/05/08/a-slow-baby-turtle-and-two-ghost-crabs/*. Rahul was selected as a Duke Global Fellow in Marine Conservation for 2014.

people used to collect bat guano from the temples and use them in fields as fertilizer. A preliminary chemical analysis of the guano showed high levels of NPK, which means that it would be effective addition as fertilizer/manure. More importantly, though, bats provide key ecosystem services such as pollination, seed dispersal and pest control of insects in paddy fields. We hope to quantify the advantages of maintaining these bat populations in the next phase of our temple-bats research.

M. Mathivanan, Field Coordinator, Agasthyamalai Community-based Conservation Centre

More experiments with crowd sourcing: National Moth Week

The India Biodiversity Portal conducted its second crowd sourcing effort—the National Moth Week—from 19-27 July. This global citizen science initiative came quickly after the Neighbourhood Trees Campaign in April, which had seen encouraging response. The experiment added 2,816 moth observations, 3,355 species pages and 121 documents through the efforts of 181 users from across 150 locations. The exercise yielded valuable spatial, temporal, and descriptive data on moths from contributors.

But what about the quality of data received from non-experts? Identification of moths requires a level of expertise that is not common in India. The portal attracted some users who helped in identifying observations. But the final verification is by lepidopterists who park the observations in their proper species pages and further populate the pages with relevant content.

The portal itself, by definition of what it seeks to accomplish, has always been a work-in-progress site. This time, the organizers drew lessons from the interactions of the Neighbourhood Trees Campaign, to improve contributor experience: the portal enabled upload of images in bulk, with provision for creating observations from these images in batches. This feature allowed users to return to the images when convenient, and improved efficiency of uploads.

For further information on IBP visit *http://indiabiodiversity.org/*

Using urban wastewater for agriculture in peri-urban Bangalore

The urbanization-impacts project team of the Land, Water and Livelihoods programme organized a workshop on *'Water quality and livelihoods in peri-urban Bangalore'* with invited experts in the areas of agricultural economics, wastewater irrigation, pollution regulation and water law to review three years of completed work by the project, and examine the plan for the next two years in light of the ensuing discussions.

The project team had prepared draft articles based on results from research so far, which they presented in four technical sessions in the day-long workshop. The first session dealt with the impact of wastewater irrigation on livelihoods in the Vrishabhavathy catchment in peri-urban Bangalore. The second session reviewed the sources of pollution and the nature of contaminants. The third session focused on the issue of regulating industrial water pollution. The final technical session was devoted to a discussion of the proposed health risk assessment planned for the next phase of the project. The workshop concluded with a panel discussion where the experts commented on the larger policy questions and research issues that emerged from the day's proceedings.

The workshop, with 40 participants, was held on September 15, 2014. Experts invited were Dr. Priyanie Amerasinghe (International Water Management Institute, Hyderabad), Prof. Paul Appasamy (Madras School of Economics, Chennai), Ms. Lovleen Bhullar (Environmental Law Research Society, New Delhi) Prof. M. G. Chandrakanth (University of Agricultural Sciences, Bangalore), Prof. Ligy Philip (Indian Institute of Technology, Chennai), Dr. Armin Rosencranz (Stanford University, USA), and Dr. Rama Mohana Turaga (Indian Institute of Management, Ahmedabad).

This project is supported by Sir Dorabji Tata Trust and Allied Trusts.

Outreach

Vembanad Bioblitz inauguration

Vembanad Bioblitz is a joint project initiated by ATREE CERC, India Biodiversity Portal, Wipro Foundation and the *Jalapaadom* schools to nurture young talent in biodiversity documentation and research. The pilot project aims to provide school children in the Vembanad area a platform to identify, document and monitor local biodiversity. The project was inaugurated on 18 August at the Government HSS, Karapuzha by the Honourable Minister of Forest and Wildlife, Government of Kerala, Shri Thiruvanjoor Radhakrishnan. Shri MP Santhosh Kumar, Municipal Chairperson, Kottayam presided. Field guides prepared for the programme was also released during the function.

New

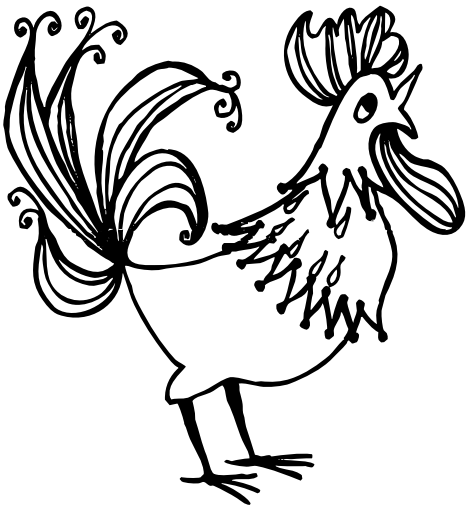
Recognitions

Chandrima Home, PhD batch 2009, and **Hita Unnikrishnan**, batch 2011, got the Best Student Talk Award at the Student Conference on Conservation Science 2014. Bangalore. 25-28 September for topics, *Predation 'dog'ma: patterns of livestock depredation by a free ranging commensal in the Upper Spiti landscape, Himachal Pradesh;* and *Historical contestations around an urban lake: lessons learnt for lake management in Bangalore city,* respectively.

Nachiket Kelkar, PhD batch of 2013 won the quiz at the Student Conference on Conservation Science 2014. Bangalore. 25-28 September.

People

Vivek Ramachandran has joined as Consultant on the MoES hydrology project of the Ecosystem Services and Human Wellbeing programme. **Sanjay Rattan, Divya Soloman** and **Chidanand** also as Consultants on ATREE–Alliance of Religions and Conservation project, CARIAA-ASSAR (Adaptation at scale in semi-arid regions to climate change and variability: Assessing vulnerability and impacts on livelihoods) and IDRC (Adapting to Climate Change in Urbanizing Watersheds, or ACCUWa) projects, respectively. **Uden Bhutia** is Junior Research Fellow in the DBT–Eupatorium project in Gangtok.



Workshops organized

Lele, S. *Social science for conservation biologists: an introduction.* At the Student Conference for Conservation Science 2014. Sponsored by Indian Society for Ecological Economics. Bangalore. 25 September 2014.

Publications

Book

Lele, S. and A. Menon (Eds). 2014. *Democratizing forest governance in India.* India: OUP

Book chapter

Lele, S. 2014. What is wrong with Joint Forest Management? In: *Democratizing forest governance in India* (eds Lele, S. and A. Menon). Pp.25-62. New Delhi: Oxford University Press.

Lele, S. and A. Menon. 2014. Epilogue. In: *Democratizing forest governance in India* (edsLele, S. and A. Menon). Pp. 402-414. New Delhi: Oxford University Press.

Lele, S. and A. Menon. 2014. Introduction: Forest governance beyond Joint Forest Management, Godavarman, and tigers. In: *Democratizing forest governance in India* (eds Lele, S. and A. Menon). Pp. 1-22. New Delhi: Oxford University Press.

Menon, A., V. Lobo and S. Lele. 2014. The commons and rural livelihoods: shifting dependencies and supra-local pressures. In: *Democratizing forest governance in India* (eds Lele, S. and A. Menon). Pp. 376-401. New Delhi: Oxford University Press.

Rai, N. D. 2014. Views from the *podu*: approaches for a democratic ecology of India's forests.In: *Democratizing forest governance in India* (edsLele, S. and A. Menon). Pp.149-180. New Delhi: Oxford University Press.

Swamy, S. and M. S. Devy. 2014. Reshaping neighborhood parks for biodiversity and people: a case of unsung socio-ecological systems in Bangalore, India. In: *Social–ecological systems in transition* (eds Sakai, S. and C. Umetsu). Global Environmental Studies. Japan: Springer.

Peer reviewed articles

Athreya, V., M. Odden, J. D. C. Linnell, L. Krishnaswamy, K. U. Karanth. 2014. A cat among the dogs: leopard *Panthera pardus* diet in a human-dominated landscape in western Maharashtra, India. *Oryx* 1 doi: 10.1017/S0030605314000106

Das, S., B. Behera and A. Mishra. 2014. Factors affecting household perception of wetland biodiversity conservation in West Bengal, India. *International Journal of Ecological Economics and Statistics* 34 (3).

David, P., R. Manakandan, T. Ganesh. 2014. Frugivory and seed dispersal by birds and mammals in the coastal tropical dry evergreen forests of southern India: a review. *Tropical Ecology* 56(1): 41-55.

Goswami, R. and T. Ganesh. 2014. Carnivore and herbivore densities in the immediate aftermath of ethno-political conflict: The case of Manas National Park, India. *Tropical Conservation Science* 7 (3):475-487.

Ismail, S. A., J. Ghazoul, G. Ravikanth, C. G. Kushalappa, R. Uma Shaanker, and C. J. Kettle. 2014. Fragmentation genetics of *Vateria indica*: implications for management of forest genetic resources of an endemic Dipterocarp. *Conservation Genetics* doi: 10.1007/s10592-013-0559-7.

Ismail,S. A., J. Ghazoul, G.Ravikanth, C. G. Kushalappa, R. Uma Shaanker, and C. J. Kettle. 2014. Forest trees in human modified landscapes: ecological and genetic drivers of recruitment failure in *Dysoxylum malabaricum* (Meliaceae). *PLoS ONE* 9(2): e89437.

Krishnaswamy, J., S. Vaidyanathan, B. Rajagopalan, M. Bonell, M. Sankaran, R. S. Bhalla and S. Badiger. Non-stationary and non-linear influence of ENSO and Indian Ocean Dipole on the variability of Indian monsoon rainfall and extreme rain events. *Climate Dynamics* doi 10.1007/s00382-014-2288-0.

N. Sapna Bai, O. K. Remadevi, T. O. Sasidharan, M. Balachander and P. Dharmarajan. 2012. Cuticle degrading enzyme production by some isolates of the entomopathogenic fungus, *Metarhizium anisopliae* (Metsch.). *Journal of Bio-Science* 20: 25-32. (Note: Though this paper was submitted in 2012 and shows that year as the year of publication, it was published in 2014.)

Savitha M., Jojo T. D. and G. Kuriakose. 2014. Interspecific interaction between *Cryptocoryne sp.* and *Etroplus suratensis B.* (Pearl Spot) in the estuarine ecosystem of Vembanad Lake in central Kerala. *Heartian Journal of Pure and Applied Sciences* 3(1): 90-98.

Senthilkumar, U., R. K. Choudhary, M. Sanjappa, D. Narasimhan, R. Uma Shaanker and G. Ravikanth. 2014. Livelihood and

revenue: role of rattans among mongoloid tribes and settlers of Andaman and Nicobar islands, India. *Ethnobotany Research and Applications* 12:141-154.

Shivanna, K. R. 2014. Reproductive assurance through autogamy in some annual weed species. *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences* 84(3):681–687.

Shweta, S., M. B. Shivanna, B. R.Gurumurthy, R. Uma Shaanker, T. R. Santhosh Kumar and G. Ravikanth. 2014. Inhibition of fungal endophytes by camptothecine produced by their host plant, *Nothapodytes nimmoniana* (Grahm) Mabb., (Icacinaceae)". *Current Science* 107 (6):994-1000.

Smitha, S. G., T. O. Sasidharan, O. K. Remadevi and J. Bhattachaya. 2013. Microsporidian infection in wild and captive-bred populations of butterflies in South India. *Biosystematica* 6(2):39-45.

Suma, H. K., V. Kumar, U. Senthilkumar, P. Mohana Kumara, G. Ravikanth, T. R. Santhoshkumar, R. Uma Shaanker. 2014. *P Pyrenacantha volubilis* Wight, (Icacinaceae) a rich source of camptothecine and its derivatives, from the Coromandel Coast forests of India. *Fitoterapia* 97: 105–110.

Popular press

Ramachandran, V. Security threat to hornbill. *Down to Earth.* August 2014.

Papers presented in seminars/ workshops/symposia/conferences

Aditya, V. *Assessing the impacts of landscape change and habitat degradation on mammal diversity and distribution in the northern Eastern Ghats, Andhra Pradesh, using ecological, geographic and social information.* At the Seminar on Environmental Protection in the Eastern Ghats. Held by Samata. Ananthagiri, Andhra Pradesh. 28-30 August 2014.

Das, S., Behera, B., Mishra, A. *Socioeconomic and institutional issues of management of two freshwater lakes in West Bengal, India.* 15th World Lake Conference. Organized by International Lake Environment Committee (ILEC) in Perugia, Italy. Travel support from Science and Engineering Research Board (SERB), Department of Science and Technology, Government of India.

Srinivasan, V., B. Thomas and P. Jamwal. *Adapting to climate change in urbanizing watersheds.* At conference on Climate Change Vulnerability and Adaptation. Organized by CSTEP, ISET-N and PAC. Bangalore. 26-27 August 2014.

Invited lectures

Lele, S. Three lectures on '*Introduction to GIS and Remote Sensing'*. Department of Agricultural Economics, Tamil Nadu Agriculture University, Coimbatore. 8 July 2014.

Shivanna, M. B.

- *Resolving taxonomic challenges.* Division of Natural Resource Management, ICAR Research Complex for North East Hill Region. 31 July 2014.
- *Bioprospecting bioresources.* Central Agricultural University, Barapani, Shillong, Meghalaya. 2 August 2014.
- *Tree of life: angiosperm phylogeny.* Lecture workshop on Genetic Diversity, Molecular Evolution and Genomics. Vellore Institute of Technology, Vellore. 12-14th August 2014.

Grants

Sarala Khaling, Regional Director, ATREE Eastern Himalayas. Euro 276,100 from Karl Kubel Foundation for Child and Family Welfare, Bensheim, Germany. For the project, *'Integrated approaches to enhance livelihoods sustainability of communities in the fringe areas of Manas Tiger Reserve, Assam'*. July 2014-December 2017.

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