# ANNUAL REPORT
## 2013 - 2014

FERAL

**FOUNDATION FOR ECOLOGICAL RESEARCH ADVOCACY AND LEARNING (FERAL)**

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# About Us

FERAL is a non-profit trust formed on 22nd of July 1997. We have six programmes through which we fulfil our mandate of conducting data driven ecological research which addresses issues of livelihoods, natural resources, education and outreach. Our activities are co-ordinated from the campus close to Puducherry and our office in Bangalore. We also have field stations located at Ariyankavu (Kerala), and Emerald (Tamil Nadu).

We are certified as a scientific research institution by the Department of Scientific and Industrial Research (DSIR), Government of India.

# Mandate

**FERAL** - once wild, run wild again.

Foundation or goal of our organisation is to find ways to help natural processes return to a more natural or less degraded state.

**Ecology**, as we define it, is the study of the interactions of organisms within and across species in a shifting landscape of communities subject to the physical environments they inhabit. Our primary focus of work studies the interface and relationship between ecology and society.

**Research** is the key ingredient to our understanding of ecological systems. We believe that ecological science is not well enough established to make broad prescriptions that apply universally. Thus each ecological dilemma needs rigorous analysis that can then provide guidelines for local action.

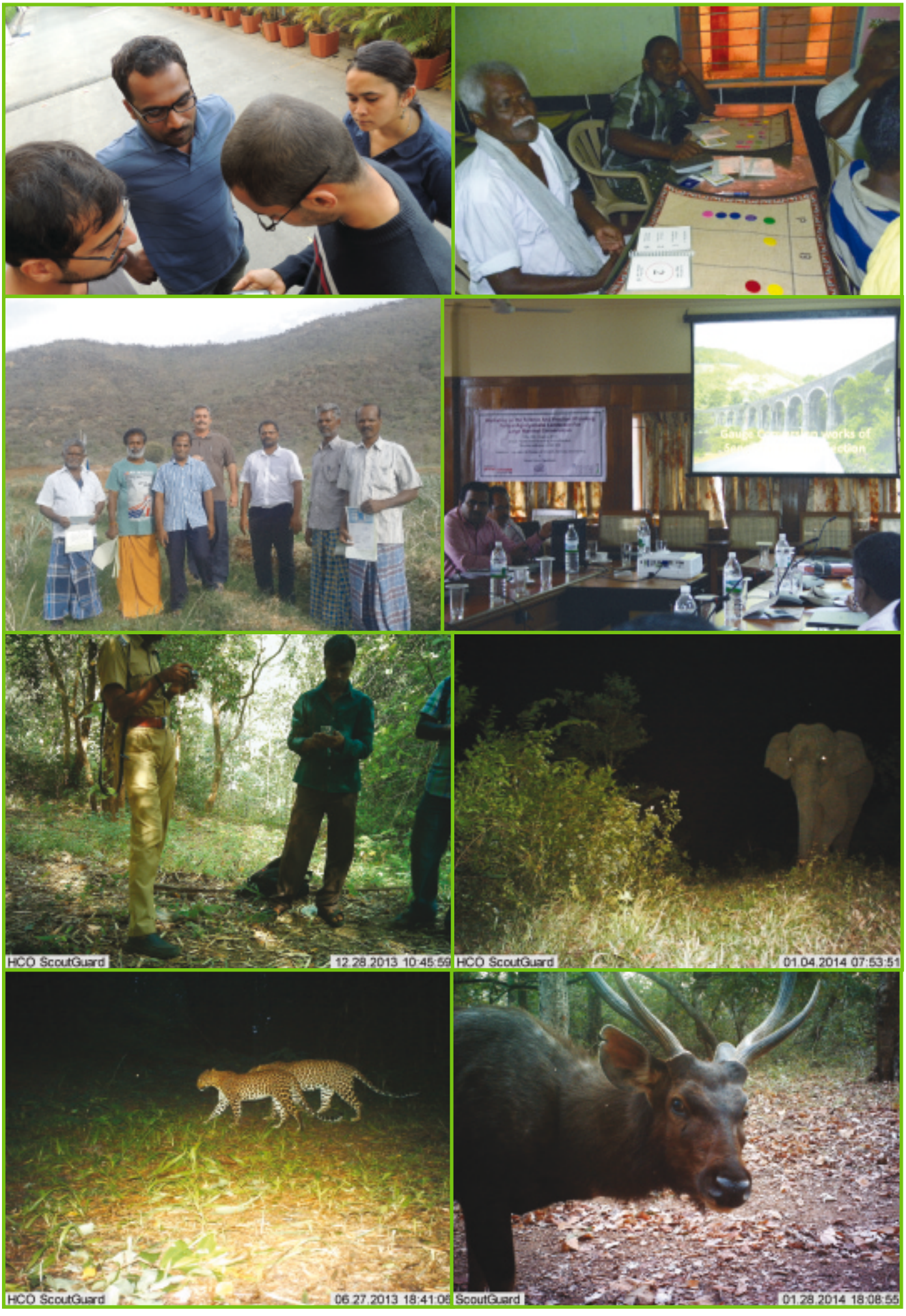
**Advocacy and Action Research** for appropriate natural resource management is the fourth lynchpin of our organisation. For us this is a mix of negotiation, facilitation and mediation where possible, but as a last resort litigation is also a potential option.

**Learning** is the final head on our chimera. To keep abreast with scientific development, we continuously strive to learn newer techniques for analysis, new tools and developments in the field of ecology, action research and advocacy. We further endeavour to pass on these learnings to others.

Our mandate is to provide a base and support for young researchers to follow their research interests and priorities; to impart training in ecological research, field survey techniques and tools; and finally to apply ecological research to solve issues in conservation of ecosystems and processes, natural resource management, and for advocacy.

# The year that was

2013-2014 saw the implementation of 14 projects, and organising two international events. Six of these were new. This year also saw us consolidating and completing five projects. There was emphasis on policy advocacy through engagements at various levels, both in the Western Ghats as well as along the Coromandel coast. Meetings with policy makers in the Kerala Forest Department, Southern Railways, Fisheries Department of Tamil Nadu and Puducherry were some of our efforts. This year we also initiated a study on fisheries along the West Coast of India.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**Focus of the Programme**

To undertake scientific research on wildlife and use the outputs to steer landscape level conservation interventions. The programme focusses on areas outside formal protection especially in biodiversity hotspots and in areas where critically endangered species are known to occur.

In the year gone by, we completed three projects under this programme. In the Periyar-Agastyamalai landscape our study on functional connectivity for large mammals saw a successful completion of field work. Preliminary results reiterate the lack of connectivity for tigers and elephants across the Shencottah Gap. Our project on enhancing biodiversity outside protected areas in the Shencottah gap was continued. Along with making community payments we also made progress in making direct payments to individuals to enhance biodiversity on private lands, bringing an area of 131 acres under better land management and also providing potential habitat for wildlife.

Our work on addressing large mammal connectivity in the Shencottah Gap was further supported by the Critical Ecosystem Partnership Fund. Under this project an important workshop, along with the Kerala Forest Department, was convened to address issues of linear barriers in the landscape. The workshop was attended by officials from the Southern Railways of India, Kerala Forest Department, researchers and conservation biologists working in the landscape. This was followed up by field visit to the area and reports on interventions required to facilitate movement of large mammals across linear barriers in the Shencottah Gap was submitted to the Kerala Forest Department for further action.

The collaborative project with Rainforest Alliance to certify rubber plantations continued. During this year diagnostic audits of rubber estates were carried out and findings were presented to the management of the estates to enthuse interest in rubber certification.

We also initiated a study, funded by the Critical Ecosystem Partnership Fund, to assess the feasibility of using open source software and free satellite imageries to measure the outcomes of their intervention in the Western Ghats. Three indicators - forest cover, carbon sequestered, and hydrological services are being monitored using remotely sensed data for the period 2000-2013.

This year we trained ecologists and conservation practitioners working in the Western Ghats in the use of spatially explicit tools. These training programmes have built capacities of these researchers to use spatially explicit data from a variety of sources to address issues in conservation of wildlife and their habitats.

# Wildlife Biology and Conservation

# Bridging the Shencottah Gap: How Payments for Ecosystem Services Can Restore Biodiversity Outside Protected Areas in India

Protected Areas constitute only about 4% of the land area of India. Many ecologically rich and sensitive regions are outside this network, thus providing a potential for enlarging the Protected Area network by incorporation of additional land. While such inclusions are possible with Government owned land, incorporating privately owned land can be expensive and time consuming. How then, can we maintain and enhance biodiversity in areas identified as corridors which include privately owned land?

This project seeks to establish protocols and build experience in using a payments for ecosystem services approach to restore and conserve biodiversity in such areas. The project also seeks to rationalize the existing PA network to incorporate areas within multiple use Reserve Forests critical to long term sustenance of wildlife and their habitat. The project targets the Shencottah gap, a mosaic of remnant moist and dry deciduous forests interspersed with rubber, tea, teak, and other farms.

Key milestones achieved include:

a) Data on species richness, distribution and connectivity for large mammals from this project has contributed towards identification and delineation of the most significant areas for large mammal conservation which are outside the PA network and these results have been shared with respective State Forest Departments to facilitate ongoing conservation efforts.

b) Our results indicate two potential areas that are important corridors for large mammal connectivity, especially tiger and elephant and prioritizes restoration actions that needs to be immediately undertaken. These finding have been included in the Tiger Conservation Plan for the Periyar Tiger Reserve.

c) Along with piloting community payments towards monitoring wildlife we also signed agreements with individual landowners to enhance biodiversity on private lands, bringing an area of 131 acres under better land management and also providing potential habitat for wildlife.

***Principal Investigator: Srinivas Vaidyanathan***
***Supporting Partner: Critical Ecosystems Partnership Fund, USA***
***Budget: USD 499,443***

# Overcoming Barriers: Restoring Ecological connectivity across linear intrusions in the Shengottah Gap

Protected Areas in India occur as small isolated management units within a matrix of Reserve Forest, forest plantations and production landscapes. Often, linear intrustions like roads, railway line and power lines fragment this matrix, disrupting free movement of wildlife from one patch to another. Management efforts so far have been PA centric and only in the last couple of years, has the focus changed to managing our remaining wildlife and wild habitats as landscape units.

As a first step towards a landscape level management, minimal efforts have gone into identifying coarse scale corridors, which are crucial for many ecological processes, including dispersal, gene flow and demographic rescue. As a result, current efforts by governmental and non-governmental organizations have focused on mapping corridors and conserving areas that facilitate movement to maintain population connectivity. However, no systematic effort has been made to identify important barriers to movement—landscape features which impede movement and identify areas where restoration could most improve connectivity.

Thus understanding the impacts of barriers, complements corridor mapping, and will help by broadening the range of conservation alternatives available to managers to restore connectivity. It can inform decisions on trade-offs between restoration and protection; for example, land purchase may be substantially more costly than restoring connectivity along across a road that blocks an alternate corridor. This project seeks to establish protocols to evaluate the impacts of linear barriers in the Shencottah Gap, a critical corridor for large mammals in the southern Western Ghats and use methods to optimise selection of areas that require restoration to enhance connectivity.

Key highlights include:

(a) The workshop “The Science and Practice of Linking Periyar-Agastyamalai Landscapes for Large Mammal Conservation” saw active participation from scientists, conservation biologists, officers from the Southern Railways of India and Kerala Forest Department. Outcome of this workshop was the decision to identify potential actions that could facilitate large mammal movement within the Shencottah Gap and to make recommendations to the Kerala Forest Department to pursue restoration efforts.

(b) Recommendations and action points based on field visit by officials from the Forest Department, scientists, conservation biologists were made to the Kerala Forest Department.

(c) Ongoing field surveys indicate lack of connectivity for tiger across linear barriers. However for the first time we documented tigers close to the National Highway 208 in the two potential corridors that we had previously identified.

(d) Data collected so far also indicates linear intrusions are barriers to elephant dispersal. During this period, in the western most corridor, not only did we record tuskers coming close to National Highway 208, we also collected photographic evidence of herds with females and calves coming close during the dry season. This is significant, and indicates the need to establish connectivity not just for dispersing bulls, but also perhaps, seasonal corridors for movement of larger herds.

The preliminary results indicate that connectivity for tigers and elephants across the Shencottah gap can be restored and corridors that we have identified are functional for some large mammals. However restoring connectivity needs a combination of structural modifications to linear intrusions and habitat improvement within the two corridors.

***Principal Investigator: Srinivas Vaidyanathan***
***Supporting Partner: Critical Ecosystems Partnership Fund, USA***
***Budget: USD 145,958***

# Functional connectivity for large mammals in southern Western Ghats, India: Linking movements and distribution

The Shencottah Gap is one among the major gaps for large mammal connectivity in the Western Ghats of India, separating the Periyar-Srivilliputhur complex of reserves to the north and the Agasthyamalai complex to the south. Conversion of forests into plantations, settlements and the presence of linear barriers has resulted in a loss of connectivity across this gap. Elephant movement has not been known to occur for the past three decades. This project aimed to assess the status of connectivity, and identify potential corridors for restoration, in a manner that they would not increase the potential for human-wildlife conflict. During the period September 2011 to September 2013, information from more than 37,000 camera trap-days covering an area of 400 sq km was collected.

Key findings from the camera trap surveys include:

(a) Photographic evidence strengthening earlier identification of two major elephant corridors and the threats to them;

(b) Quantification of seasonal dynamics in corridor use by elephants.

(c) Documentation of significant tiger use of corridor region.

(d) Documentation of leopards crossing linear intrusion.

These findings have helped the Shencottah Gap to become a priority landscape for corridor restoration. Overall, this project has enabled the collection of a large volume of scientific data on large mammals in a critical wildlife corridor, as well as contributed towards conservation action by the government.

***Principal Investigator: Aditya Gangadharan & Srinivas Vaidyanathan***
***Supporting Partner: US Fish and Wildlife Services, USA & Wildlife Conservation Society, USA***
***Budget: USD 65,810***

# Exploring Sustainable Landuse Practices in Rubber Plantations in a Critical wildlife Corridor

Scientific literature both in India and abroad establishes that landscape-level corridors are as important as Protected Areas to achieve long-term conservation goals. In the southern Western Ghats, especially in the state of Kerala, rubber is a major crop and many plantations adjoin wildlife rich forests making them potential corridors. A similar situations exists in the biodiversity rich North-eastern states of India where rubber is fast expanding. However, plantations of rubber are largely monocultures, deviod of ground vegetation and often the management practices are not biodiversity friendly. These aspects affect various ecological process, and there is a need to develop practices which are not only biodiversity friendly but also ensure sustainable farm management which is beneficial in the long run.

In this project, we investigate ecologically sustainable practices that can be adopted by rubber plantations. We also explore a certification process, linked to Corporate Social Responsibility Programmes and "green market" initiatives that incentivises plantation owners to manage their land in a more biodiversity-friendly manner. The proposed standards are directly linked to markets and are best management practices that are based on ecological and social indicators. The ecological indicators fall in the realm of habitat restoration which is required to re-establish habitat connectivity and provides economic benefits, while safeguarding agricultural production. Such long term mechanisms ensure that co-managed conservation initiatives are successful and connectivity is enhanced in biodiversity hotspots. The project focuses on market linkages to enhance biodiversity while safeguarding rubber production by introducing the Rainforest Alliance's "Sustainable Agriculture Network" standard or the SmartWood program under the Forest Stewardship Council standards.

Key milestones achieved include:

a) A report on ecologically sustainable practices for rubber plantations, and a preliminary report on market options for certified rubber.

b) Website aimed at disseminating information on ecologically sustianble practices and certification for rubber and rubber wood (http://www.feralindia.org/ecoag) was launched. The website also has training material on certification useful for interested rubber growers. Other information that has been made available through this website includes a checklist of different taxa found in the southern Western Ghats in and around rubber plantations.

We continued our interactions with the rubber industry, providing large plantations with technical inputs to move towards a more ecological and sustainable approach. Also, we participated in the First Rubber Meet, India organised by the Rubber Board of India which provided us the opportunity to learn more about this industry and also interact with the different stakeholders. As part of the learning and training process, the FERAL team has been participating in stakeholders workshop organised by Rainforest Alliance.

***Principal Investigator: Sunita Ram & Srinivas Vaidyanathan***
***Supporting Partner: Critical Ecosystems Partnership Fund, USA***
***Budget: USD 39,833***

# Parapatry between the Common Langur (*Semnopithecus priam*) and the Nilgiri Langur (*Semnopithecus johnii*)

The Nilgiri langur (*Semnopithecus johnii*) is a threatened colobine endemic to the southern Western Ghats. Their distribution in some parts overlaps with that of the Hanuman langur (*Semnopithecus priam*), an endemic to south India and Sri Lanka. Such overlaps, along parts of common boundaries between species is known as parapatric distribution and are potential areas where natural hybridization can occur. Although natural hybridization has been reported from some locations for these two species, studies that have systematically documented extent of parapatry and zones of hybridization are very limited. Natural hybridisation plays an important role in shaping the trajectories of evolution of species which could over the years result in a new species at one extreme and cause the disappearance of an endangered parent species at the other. The common occurrence and the importance of natural hybridization in primate evolution and conservation is only now being recognised.

This project looks at the extent of parapatry between these langur species in the Anaimalai hills and aims to identify regions of possible hybridization in this landscape. Also, we look at the influence of specific environmental and habitat factors on the distribution pattern of these primate species. Given the ambiguity in the langur taxonomy, data on distribution, parapatry and zones of hybridization from this study will be of considerable importance from the perspective of conservation and management.

Key highlights include:

a) The study shows that the area of parapatry between the two langurs was concentrated along the western side of the study area where the occurrence of Hanuman langur was higher.

b) The areas of higher probability of co-occurrence of the two species was characterized by forests with fairly high tree cover (more than 40%), that were moist, and at elevations above 685m that were not very steep. The area is typically deciduous adjoining wetter forest types.

***Principal Investigator: Sunita Ram & Srinivas Vaidyanathan***
***Supporting Partner: Primate Conservation Inc., USA***
***Budget: USD 3,401***

# Thematic training on GIS and remote sensing for conservation research and planning

Emerging technologies and research methods often outpace syllabi and formal courses that are offered in research institutes in India and abroad. This lag can result in a serious disadvantage to researchers and practitioners who need to compete with peers who have training in these tools. Emerging from this need and as a collaborative effort between five institutes, this project tried to close the gaps in four subject areas, namely, GIS and remote sensing, spatial statistics, landscape ecology and hydrology.

Key highlights include:

a) A series of workshops were held where over a hundred researchers and professionals participated. Most of these workshops were jointly hosted with partner institutes leading to the creation of a network of experts on these subjects.

b) The workshops used data that is already hosted on the Western Ghats Biodiversity Portal, to facilitate the tutorials to be modified to other regions and to increase the user base for the portal and its facilities.

c) Teaching materials, reading lists, tutorials and quizzes are hosted on an open source course management platform, Moodle <http://www.feralindia.org/moodle/> which is being shared with the teaching community and other researchers.

***Principal Investigator: R. S. Bhalla***
***Supporting Partner: ATREE-CEPF Western Ghats Small Grants Programme***
***Budget: INR 10,94,000***

**Focus of the Programme**

This programme was started with a series of projects on water, sanitation and hygiene, (hence its title) which, over the years, led to collaborations with agencies such as UNICEF and the MGMCRI. The programme has since moved towards research in hygiene and health and studies on epidemiology and water quality monitoring.

Last year we completed two projects, the first was to implement a sustainable system to provide safe drinking water and adequate sanitation facilities for children. This project successfully constructed new toilets and refurbished existing ones and undertook awareness programmes at schools. The second project studies the effect of open defaecation on parasite loads in children.

We also established a collaboration with the Mahatma Gandhi Medical College and Research Institute, Puducherry to map vector borne diseases including malaria, dengue, chikungunya, and filaria in realtime using smartphones located in primary health Centres. With this study we hope to establish patterns between diseases and favourable conditions for these important vectors and to understand the impacts of localised effects of inappropriate land-use and waste disposal and that of climate change.

# Water, Sanitation, and Hygiene


Providing
Safe Water and Sanitation
for Schools

# The implementation of a sustainable system to provide safe drinking water and adequate sanitation facilities for the girl child around Chennai

One of the strategies that has been adopted by FERAL in its approach to WASH is to target school children. This has a number of advantages over sanitation interventions for individual households. For one, it targets the younger generation who are more likely to alter their behaviour with respect to open defecation. Further, by restoring and building infrastructure in schools, we can ensure the regular and continued use of facilities created.

This project, implemented in partnership with the Technology and Action for Rural Advancement (TARA), involved a series of activities and interventions in six schools located near the FORD Motors factory close to Chennai. The activities included the restoration and construction of drinking water facilities and toilets and a number of awareness generation programmes.

Key highlights include:

a) A total of 14 toilets were constructed in the selected schools and another two were refurbished.

b) The awareness programmes tried to sensitise school children on the need for clean water and sanitation, both at school and at home. Interactions with the students revealed that a very small proportion of students had toilet facilities at their homes.

c) In an effort to sustain the activities initiated by the project, eco-committees were formed in the schools and members were trained in the maintenance of the toilet infrastructure created.

***Principal Investigator: Gaspard Appavou***
***Supporting Partner: Ford Motors - Chennai***
***Budget: INR 12,49,375***
***Collaboration: Technology and Action for Rural Advancement (TARA)***

# Assessing the impact of integrated WASH plus mass treatment approach for the control of soil transmitted helminths in children in Cuddalore, Tamil Nadu, India

As part of an initiative to pursue community based health research, a pilot project on worm-load in school going children of Cuddalore district was undertaken. The team from FERAL was in charge of the Community based data and specimen collection while the Mahatma Gandhi Medical College and Research Institute were responsible for the assessment of parasite load.

The study indicated that prevalence of helminth parasites in the study community was very low to nil, indicating, success, at least in the short term, of WASH and mass treatment approach to control soil transmitted helminth worms in Chidren.

***Principal Investigator: Rauf Ali and Neil W. Pelkey***
***Supporting Partner: University of Notre Dame, USA & FERAL-Incubation Fund***
***Budget: USD 3,500 + INR1,70,000***
***Collaborations: University of Notre Dame, USA; CIDRF & MGMCRI, Sri Balaji Vidyapeeth University, Puducherry; Quest International University, Malaysia***

**Focus of the Programme**

The focus of the Natural Resources Management programme is to encourage the adoption of data driven ecological sciences to answer real world issues in the management of natural resources.

The programme has two primary areas of interest: ecosystem services with a focus on hydrologic services, and coastal zone management and vulnerabilities. The likely impacts of global climate change on resource availability and the need for scientific management of these resources and services is the overall framework under which projects and activities are undertaken.

Activities in coastal zones have a strong overlap with ongoing research in fisheries. Our work last year continued and consolidated initiatives on sustainable management of marine fisheries. The highlight of this was the co-management meetings held with the stakeholders and the recommendations for managing fisheries sustainably that resulted as a consequence. Details of the projects are given under the marine sciences programme.

Our work on water resources deals with quantification of hydrologic services across different climatic, environmental and management regimes. The likely impact of climate change, particularly in terms of extreme rainfall events, has been a constant theme of the research. We work in small intensively instrumented catchments as well as at watershed scales, where comparisons of different land cover on surface discharge, sediment and nutrient yields are made across different sites. This year saw us continuing our work in the catchments of the Avalanche and Upper Bhavani reservoirs located in the Upper Nilgiris in the Western Ghats.

# Natural Resource Management

# Hydrologic and carbon services in the Western Ghats: Response of forests and agro-ecosystems to extreme rainfall events

The Western Ghats is a global biodiversity hot-spot and home to some of the most unique and threatened habitats. The region has been extensively modified through large scale plantations of exotic timber species with little knowledge about the impact this may have on ecosystem processes and services.

This project seeks to understand the complex interconnection between land cover and hydrologic and carbon services in two sites in the southern Western Ghats. The project integrates fine scale field observations on hydrologic and carbon fluxes in major land covers with rainfall patterns (studied by the UK team) and physical models of sediment transport and water balance.

The study is important as it focusses on extreme rainfall events which are increasing in the region as a direct consequence of climate change. Understanding how different land covers will alter hydrologic flows can inform policies such as the massive afforestation schemes launched under the national action plan on climate change by the Indian government.

Key highlights include:

a) This year we initiated sediment and nutrient sampling at nine stations.

b) Rainfall is being measured in 26 locations and stream flow is monitored in 12 locations across four second and third order streams which drain into the Avalanche and Bhavani reservoir.

The Indian component of the project is being led by Dr.J.Krishnaswamy (ATREE) and its institutional partners are ATREE, NCBS and FERAL. Dr. Mike Bonnell (Uni. of Lancaster) leads the UK team.

***Investigators from FERAL: R S Bhalla & Srinivas Vaidyanathan***
***Supporting Partner: Ministry of Earth Sciences, India & NERC, UK***
***Budget: USD 499,443***
***Collaborations: ATREE, NCBS, University of Lancaster, UK***







DKNY

**Focus of the Programme**

The marine sciences programme has, over the past few years, concentrated on studies of artisanal fisheries in marine and backwater regions along parts of the Coromandel and Konkan coast. These studies have relied heavily on action-research, with fisherfolk actively participating in data collection, attending meetings and workshops and in validation of findings and results.

The weak policy and negligible implementation of regulations on marine fisheries in the country has resulted in a serious depletion of coastal fisheries resources, jeapordising the livelihoods of hundreds of thousands of traditional fisherfolk.

The data driven approach to fisheries management adopted by FERAL has resulted in one of the largest repository of fish landing datasets which is rapidly being translated into popular articles, policy briefs and journal articles. We intend to use this information to engage more forcefully with policy makers in the coming years and contribute to the adoption of a more rational and participatory approach to marine fisheries management.

The highlights of the programme this year include the installation of an artificial reef about six kilometres off the Pondicherry coastline. This is the first step in a series of interventions envisaged for the conservation of coastal fisheries. This programme intends to continue its engagement at the grassroots as well as the policy level to push for the adoption of scientific and ecologically sound fisheries management.

# Finding spaces for co-existence: Fishing communities and threatened marine species conservation in India

The first of our projects along the West Coast initiated this year aims to map the overlaps between fishing and threatened species in the Ratnagiri and Sindhudurg districts of Maharashtra. The project involves profiling the types of threatened species or groups that occur in fish catch and identifying the general areas where these species (or groups) are encountered at sea. The major stakeholders are fishermen across ten villages in the two districts. The outputs at the end of the work will include, a) Mapping fishing locations for users of different gear types, b) Identifying the threatened species or groups caught in the fisheries of the region, c) Identifying the areas in the sea where these species or groups are encountered, d) Building local capacity for fisheries research and e) Documenting local priorities about fishing.

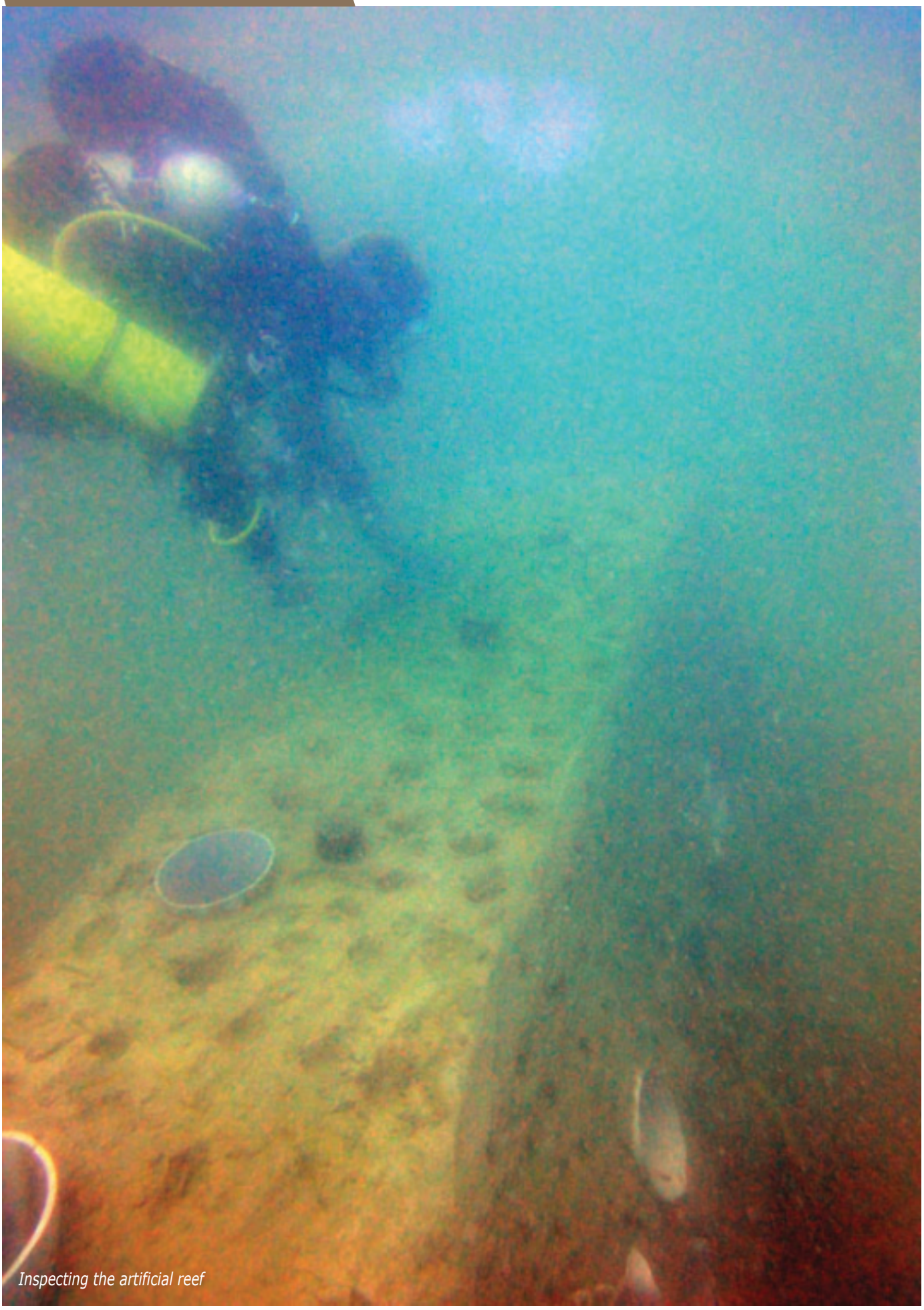
Key highlights include:

a) General fishing locations for different gear types have been obtained through interviews and some participant observations.

b) Fish landings have been monitored to identify the types of threatened species being caught. Where specimens could not be identified to the species level, they have been assigned group identities, e.g. sea turtle.

c) Volunteers including students doing Master's in fisheries have been trained to conduct fisheries research. Fishermen's perspectives have been audio and video documented.

***Principal Investigator: Divya Karnad***
***Supporting Partner: Rufford Foundation, UK and Chester Zoo, UK***
***Budget: GBP 5966 + Euro 4808***



*Inspecting the artificial reef*

# Co-management of artisanal fisheries along the Coramandel coast

This project was conceived to contribute to sustainable management of marine fisheries by strengthening initiatives in fisheries co-management. The area of focus was between the largely sandy coast between Marakannam in Villupuram District extending southwards to the deltaic areas of the Cauvery river in the region of Killai located south of Cuddalore encompassing the Union Territory of Puducherry.

Key highlights include:

a) In this final phase of the project, we undertook household surveys in 62 villages to track changes within the sector in a gap of 4 years.

b) Our team worked closely with the local fishermen to collect data on location specific catch composition, total catch weight and price. For this, we distributed eight chartplotters to trawlers and vallams for a duration of 15 months and one unit was used every three months to track fishing locations of all types of craft found along this part of the coast. This was done for 15 days each cycle in order to capture approximate daily fishing effort of the respective regions.

c) A database on location of fishing, craft and gear utilization, manpower and earnings and catch details has been compiled across all fisheries projects thus far.

d) A total of 289 and 255 people were interviewed for the market and credit surveys respectively, comprising of the key stakeholders within the community.

e) Thirty village meetings were conducted where our team shared the results of this project and preceding work. Feedback from the fisherfolk was sought and taken into consideration for the final state and district level meetings.

f) At the conclusion of the field work, we held co-management meetings during which very specific recommendations on what can be done for fisheries management have emegred. This has been written in Tamil and English as popular articles and will be published in suitable magazines or newspapers.

g) To enhance the fisheries resources along the coromandel coast we designed and constructed an artificial reef unit. This was sunk 6 km from the coast of Puducherry at a depth of 23 m. A local dive company has been identified to further develop this site and conduct simple monitoring surveys of fauna on the reef.

***Principal Investigator: Tara N. Lawrence***
***Supporting Partner: Department of Science and Technology, Govt. of India***
***Budget: INR 22,66,110***

**Focus of the Programme**

To undertake studies to address the unique set of conservation needs and challenges of islands, particularly the Andaman & Nicobars.

The programme is currently concentrating on addressing problems related to exotic invasive species. In addition, the programme looks at improving livelihoods of Island natives, which is being addressed through the Coconut Oil initiative in the Nicobar islands.

# Islands and Reefs

## From Tsunami to Virgin Coconut Oil

The project supports procurement of cold presses designed to improve the efficiency and reduce the drudgery in the extraction of coconut oil from copra. Copra, or dried coconut kernel, is the major produce of the Car Nicobar island. Via this project, persons from the local Nicobari tribe are able to extract virgin oil from the copra thereby saving considerably on transport costs and adding value to the final product.

This initiative was first funded by the Department of Science and Technology, Government of India in 2008. Since 2010 it has been supported through independent funds and presently through an award from the St.Andrews Prize for the Environment.

Key highlights include:

a) In the past year marketing of the coconut oil has begun on a small scale in Pondicherry, and there have been enquiries for much larger quantities. We are now concentrating on increasing production, however, transport from the Nicobars remains a bottleneck.

***Principal Investigator: Rauf Ali***
***Supporting Partner: University of St Andrews & ConocoPhillips***
***Budget: GBP 15,823***


INDIANA COLLEGE
CHEERLEADING

**Focus of the Programme**

Teaching and transfer of expertise to other researchers is a core mandate of FERAL. We achieve this through

- Workshops and training programmes
- Mentoring and co-guiding post-graduate and doctoral students formally and informally
- Teaching at leading academic institutions as external faculty
- Study Abroad Program

The study abroad component of this programme has brought in more than a hundred of undergraduate students, largely from liberal colleges in the US. The courses these students attended included semester long marine sciences and shorter summer courses on culture, class and gender which introduced the largely American students to the diversity and complexity of Indian culture.

In the past few years, we have extended our activities to target postgraduate students from Indian institutes in the field of ecology and environmental sciences. This is part of a strategy to build upon our own “team” by encouraging young researchers to join FERAL for their own research or as part of other ongoing studies.

Among the new initiatives we are working on in the programme are school level workshops on water quality and a series of intense short term courses for graduate and postgraduate students covering topics which are lacking in the syllabi of many teaching institutes.

# Study Abroad

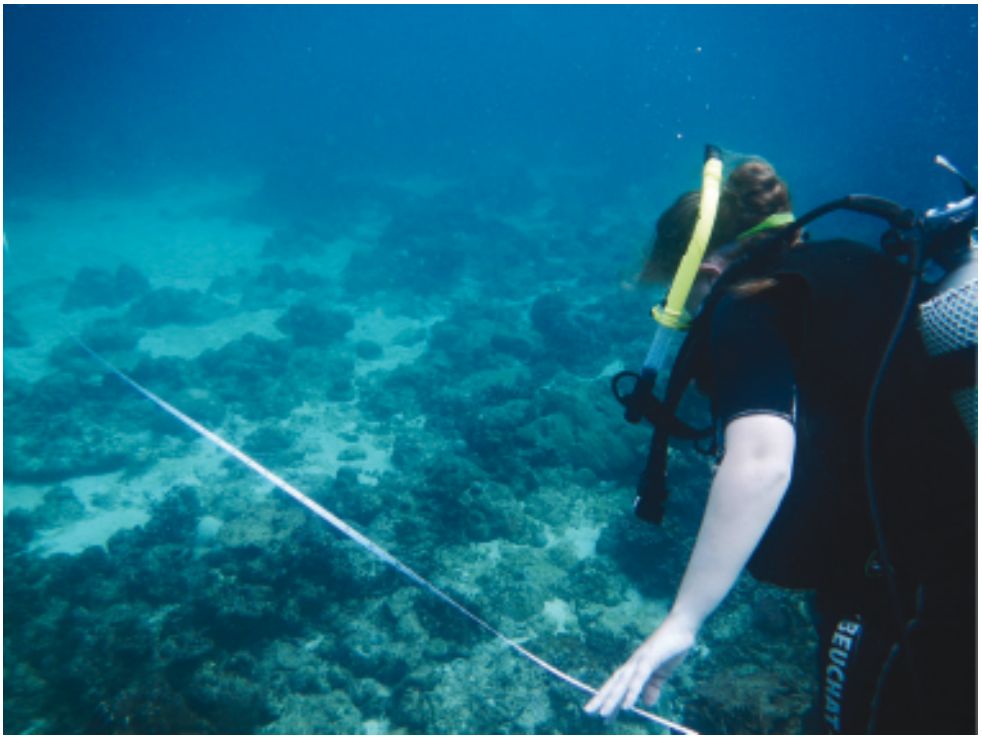
The FERAL study Abroad programme completed 10 years. Over these years the programme has conducted two semester long programs including Marine and Coastal Systems during the Spring Semester and Cultural and Social during the Fall Semester. In addition shorter summer courses have also been offered over the years. A variety of courses ranging from "Field Methods in Marine Sciences" to "Culture, Class and Gender in Coastal Management" to "Art as Sustainable Development" were taught as part of the program. The courses are targeted at undergraduate students and for faculty mainly from the USA. The courses are conducted by faculty at FERAL and through a network of collaborators from other educational institutions, research/non-governmental organisations, communities in Auroville and a few commercial establishments.

This year, we undertook a review of the program.

Key highlights include:

a) The program has reached over 100 international students, 15 faculty and 10 student internships. Of those undergraduate students, 17 have gone to complete PhD or are in the process of completing them. Another 8 have gone on to complete masters of science degrees. For others it has inspired them to make changes in career choices that have them leading organic farms or farming programs, working at wildlife parks or zoos (6 students), or running peace and advocacy programs. In addition, twelve returned to India for additional study. In short the student programs have been very successful in terms of the impact they have had on students.

b) The faculty program has hosted 11 faculty for trips and exposure visits till date. These have led to two faculty members developing a long term interest in India and consequently leading additional student trips to India.



***Principal Investigator: Neil W. Pelkey***

***Supporting Partner: Juniata College, Keystone Study Away Consortium and Brethern Colleges Abroad, USA***

# Workshops and Conferences

## Introduction to GIS

FERAL ran a half day workshop at the Students Conference for Conservation Sciences held at Bangalore in September 2013. The workshop was attended by 25 participants and covered the basics of GIS using the Quantum GIS package. R.S. Bhalla and Srinivas Vaidyanathan were the course instructors. This was supported in part by the CEPF as part of the project "Thematic training on GIS and remote sensing for conservation research and planning".

## Training Programme on GIS applications in the field of Conservation and Natural Resource Management

FERAL conducted a training workshop on GIS applications in the field of Conservation and Natural Resource Management between February 3rd to 10th, 2014 at the FERAL Bangalore office. This workshop was supported by the Wildlife Conservation Society (WCS) - Afghanisthan. Participants were Officials from the Ministry of Agriculture, Irrigation and Labor (MAIL) and the National Environmental Protection Agency (NEPA), Government of Afghanisthan. The training programme built capacities of the participants in generating and managing spatial data, carry out spatial analysis and covered the basics of remote sensing.

## Ruffords Regional Conference – Bengaluru

The Rufford India Conference, Bengaluru was held on 15th and 16th of November 2013 at the National Centre for Biological Sciences. The two day conference was jointly organised by Foundation for Ecological Research, Advocacy and Learning (FERAL), Pondicherry, National Centre for Biological Sciences (NCBS), Bengaluru and Researchers for Wildlife Conservation (RWC), Bengaluru with support from the Rufford Foundation. The Rufford Small Grants Program (RSGP) has played a crucial role in the field of nature conservation in the developing countries worldwide. It has supported over 290 research and conservation projects in India. The primary objective of this meeting was to explore different aspects of conservation and action research and building conservation capacity at local, regional, and global levels. It also provided an opportunity to the grant recipients to meet and interact. The grant recipients presented their work either as oral presentations or as posters. The conference included invited talks by Dr. Krushnamegh Kunte, Dr. Kavita Isvaran, Mr. Nishant M.S., Dr. Samrat Mondol and Mr. Manish Chandi. Two short workshops were conducted: "Communicating research findings to decision/policy makers effectively and accurately" by Dr. H.N. Kumara, Mr. Vijay Mohan Raj, and Mr. Balachandra Hedge; and “Goal oriented project planning” by Dr. Ravinder Singh Bhalla, Mr. Srinivas Vaidyanathan and Dr. Arjun Sivasundar from FERAL.

# Publications

**Journal Articles**

Joshi, Aditya, Srinivas Vaidyanathan, Samrat Mondol, Advait Edgaonkar, and Uma Ramakrishnan (2013). Connectivity of Tiger (*Panthera tigris*) Populations in the human-Influenced forest mosaic of Central India. PLoS ONE 8 (11) (November 6): e77980. doi:10.1371/journal.pone.0077980

Nayak, Rajat Ramakant, Srinivas Vaidyanathan, and Jagdish Krishnaswamy (2014) Fire and grazing modify grass community response to environmental determinants in savannas: Implications for sustainable use. Agriculture, Ecosystems & Environment 185: 197–207. doi:10.1016/j.agee.2014.01.002.

**Popular Articles**

Ali, Rauf (2013) More than you can chew. The Hindu July 6, 2013
http://www.thehindu.com/features/magazine/more-than-you-can-chew/article4884162.ece

**Conference Papers**

Lawrence Tara Nicole, Gayathri Selvaraj and Kumaran S. (2013) Implications of gear selectivity on catch diversity, trophic structure and size in fisheries along a part of the Coromandel Coast. Rufford India Conference 2013, Bengaluru.

Lawrence Tara Nicole (2013) Ecological status and management perspectives of coastal fisheries of Pondicherry, Cuddalore and Villupuram. Rufford India Conference 2013, Bengaluru.

Rajat Ramakant Nayak (2013) Protection from grazing changes vegetation composition in the western Himalayas. Rufford India Conference 2013, Bengaluru.

**Online Materials**

Website on ecoagriculture with focus on rubber plantations. http://www.feralindia.org/ecoag

Tutorials and course material for thematic training on GIS and remote sensing for conservation research and planning. http://www.feralindia.org/moodle/

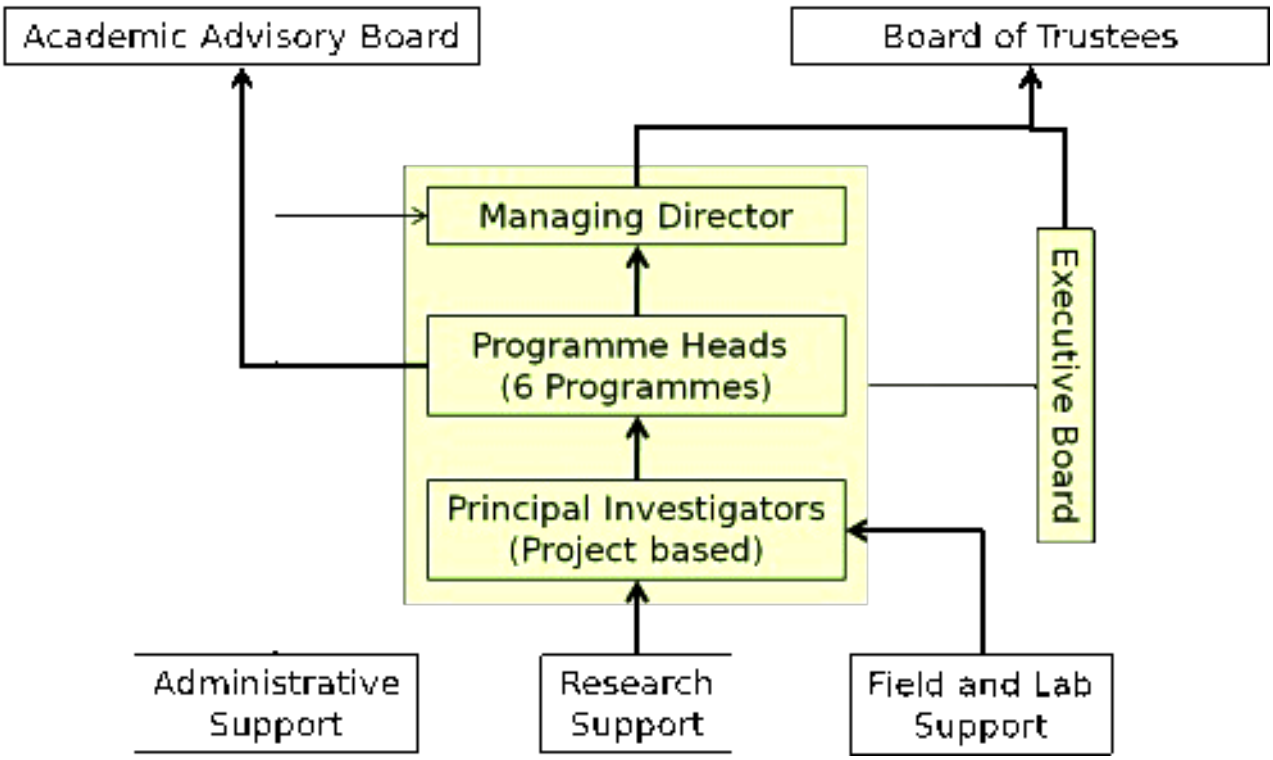
# FERAL in News

This year saw some of our published work being covered by the press:

- Conservationist wants deer hunting to save Andamans. Deccan Herald 4 August 2013. http://www.deccanherald.com/content/349164/#

- Human intervention hinders tiger connectivity. The Hindu 18 November 2013. http://www.thehindu.com/sci-tech/energy-and-environment/human-intervention-hindering-tiger-movement-in-country/article5361856.ece

# Administrative Information




**ADVISORY BOARD**

Ajith Kumar, Ph.D.
Deviprasad K. V., Ph.D.
Jagdish Krishnaswamy, Ph.D.
Karthik Shankar, Ph.D.
Mahesh Sankaran, Ph.D.
Neil Pelkey, Ph.D.
Keshavnath Perar, Ph.D.

**TRUSTEES**

Bhalla R. S., Ph.D. (Managing Trustee)
Mahesh Sankaran, Ph.D.
Pratibha Pande
Rauf Ali, Ph.D.
Srinivas Vaidyanathan

**MANAGING DIRECTOR**
Sunita Ram

The people behind FERAL are a diverse group with specific interests in the field of ecology. This team is responsible for formulating and co-ordinating the organisations activities and comprises of a number of persons introduced alphabetically (by first name) below:

**RESEARCHERS**

**Chaitanya Krishna**: Chaitanya's interest lies in arid zone ecosystems and conservation of arid zone wildlife. He is currently pursuing his PhD at Manipal University where he is studying semi-arid grasslands of peninsular India to identify human-wildlife conflict patterns and create innovative site-specific conflict mitigation measures.

Divya Karnad: Divya is a marine ecologists working on fisheries and threatened fish species along the west coast of India. She is currently pursuing her PhD at the Rutgers University, USA and is studying sustainable livelihoods of fishermen and conservation of threatened marine fish species in the West Coast of India.

**Gaspard Appavou**: Gaspard has been coordinating projects on the Water, Health and Sanitation Programmes. He holds a master’s degree in human resources management and a bachelors degree in law. His ability to moderate meetings and discussions, manage multiple field teams during surveys has been an asset to the organisation.

**Gayathri Selvaraj**: Gayathri's interest lies in reptiles, especially crocodile biology and conservation and conservation education. She assists with the KSAC study abroad program and with the project on co-management of fisheries along the Coromandel Coast.

**Kumaran S.**: Kumaran is part of our Marine Sciences team. He has a Master's in Ecology and Environmental Scienes from Pondicherry University. His interest lies in working on marine biodiversity and conservation related issues along the Coromandel Coast.

**Neil W. Pelkey**: Neil is an Associate Professor at the Juniata College, Pennsylvania, USA. An expert on GIS and remote sensing, he is an advisor on many of the projects and research proposals of FERAL. Neil is also responsible for developing the ongoing collaboration with the Juniata College and Keystone Study Abraod Consortium for facilitating their undergraduate study aboard programme in India.

**Pritika Meenakshisundaram**: Pritika has a formal training in bioinformatics. Her interests lies in using this training in finding innovative ways of disseminating ecological data and information to policy makers, public and the research community.

**R.S. Bhalla**: Ravi is an ecologist interested in the applications of quantitative techniques to community based natural resources management and ecosystem services and processes. He holds a Ph.D. in GIS and remote sensing based tools and models on water resources, with a focus on watershed management policy.

**Rajat Ramakant Nayak**: Rajat has completed his Masters in Wildlife Biology and Conservation. He has a special interest in grassland ecosystems, both low and high altitude, semi-arid and wet. He is currently part of the team focusing on the biology and conservation of ecosystems and connectivity for large mammals in the Shencottah Gap.

**Rauf Ali**: Rauf is involved in various research efforts in the Andaman and Nicobar islands with a focus on assessments and impacts of exotic species. He is active in policy advocacy for conservation efforts and is part of the researcher network across the country and worldwide.

**Senthil Babu**: Babu has an M.Phil. in History of Science. He is interested in issues affecting the coastal communities in general and the fishing community in particular. He has worked along the east coast on various issues for the last several years. He has been actively involved with our work in the Shencottah Gap, working on the social aspects of payment for ecosystem services.

**Srinivas Vaidyanathan**: Srinivas is a wildlife biologist with particular interest in understanding changes in landscape level processes and structure and how the same affect large mammal populations. He is a guest faculty at the M.Sc course in Wildlife Biology and Conservation at National Centre for Biological Sciences, where he has been co-guiding students for their Master's thesis. Srinivas's expertise is using spatial approaches to understanding various ecological and environmental questions to finding innovative and practical solutions to conservation problems.

**Sunita Ram**: Sunita has an MPhil in Bilogical Sciences from Fordham University, USA. She is currently working on factors delineating distribution of langurs in southern India. Her research interests lie in understanding the ecology and distribution of primates and finding long term conservation startegies in the southern Western Ghats.

**Sushma, H. S.**: Sushma has a post graduate degree in psychology and studied resource partitioning and inter-specific interactions of arboreal mammals in the rainforests of Anaimalai hills for her doctoral dissertation. Her broad research interests are community ecology, restoration ecology, conservation of tropical evergreen forest patches in human altered landscapes and primate behaviour. Her primary academic interests lie in behavioural ecology of primates and the role primates play in forest ecosystem functioning.

**Tara Lawrence**: Tara holds a Masters degree in Marine Biology. Her broad interests lie in the area of fisheries ecology and ecophysiology. Her interest in the fisheries sector stems from the incredible dynamics the industry displays in the face of a rapidly changing resource base.

**RESEARCH SUPPORT**

**Ignatius Peliyas**: Ignatius is interested in understanding human dimensions of conservation. He works in the Agastyamalai complex assessing the role human settlements and community based organizations play in conserving wild habitats.

**Karthik Prabhu**: Karthik is part of the field team working in the Agastyamalai landscape coordinating the field activities. He is interested in educating general public on issues related to wildlife conservation.

**Kumaran K.**: Kumaran has been working as part of our field teams in Pondicherry and in the Western Ghats. He is currently pursuing his Masters degree in Ecology at Pondicherry University.

**Nitya Sathish**: Nitya has a Master's degree in Environmental Sciences. She is currently assisting with data management and analysis.

**Saravanan S.**: Saravanan coordinates field activities in the Nilgiris.

**Selvaganesh**: Ganesh is a post-graduate, and has largely been helping the WASH team with the implementation of the projects.

**Siva T.**: Siva is a post-graduate from forestry college in Coimbatore. He works as part of the field team in the Nilgiris.

**Thammaiah C. K.**: Thammaiah has a Master's degree in forestry. He has been working as part of our field team monitoring wildlife using camera traps in the Shencotah gap.

**Vinod M.**: Vinod works as part of the field team in the Agastyamali landscape. Along with Karthik, he co-ordinates field activities.

At our field stations, a number of field assistants have been part of various projects helping with both field data collection and in maintenance of field stations.

**ADMINISTRATIVE SUPPORT**

FERAL has a small administrative support system who contribute to other projects by way of facilitating training programmes, workshops and reporting:

**Rajendran K.**: Raji is our Office Manager and is engaged in keeping the campus operational and helps organise workshops and events for various projects. The former involves facilitating the entire range of projects operating out of the campus.

**Shanthi R.**: Shanthi is our Accounts Manager handling the day to day accounting responsibilities of the organisation. She is a post-graduate in commerce and is versatile in the use of a range of accounting software.

**Venkatesh Perumal**: Our junior accountant who is a commerce graduate, assists the accounts manager.

**Sumathi, Chitra and Renuka** help with office maintanence and manage the kitchen work on campus.

**Citru** is our campus security guard.

# Partners

**SUPPORTING PARTNERS**

CEPF – ATREE Western Ghats Small Grants Programme

Chestor Zoo, UK

Critical Ecosystem partnership fund, USA

Department of Science & Technology, Government of India, New Delhi

Devlopment Alternatives – New Delhi & Ford – Chennai

Ministry of Earth Sciences, India - Natural Environment Research Council (NERC), United Kingdon: Changing water cycles award India

Primate Conservation Inc, USA

Ruffords Foundation, UK

U.S. Fish and Wildlife Service, USA

University of St Andrews & ConocoPhillips

Wildlife Conservation Society - Afghanistan

**COLLABORATING INSTITUTIONS**

Ashoka Trust for Research in Ecology and Environment, Bangalore, India

French Institute of Pondicherry, Puducherry, India

National Centre for Biological Sciences, Bangalore, India

University of Dundee: IHP-HELP Centre for Water Law, Policy and Science

Dept. of Ecology and Environmnetal Sciences - Pondicherry University

Salim Ali Centre for Ornithology and Natural History (SACON)

Researchers for Wildlife Conservation

**FOUNDATION FOR ECOLOGICAL RESEARCH ADVOCACY AND LEARNING**
**No .170/3, Morattandi Village, Avroiville Post, Tamilnadu - 605101**
**BALANCE SHEET AS AT 31.03.2014**

( Amount in ₹ )

| Particulars | Sch.Ref | 31.03.2014 | 31.03.2013 |
|---|---|---|---|
| **SOURCES** | | | |
| Corpus | 1 | (6,30,240) | (29,231) |
| Project Asset Reserve | 2 | 45,59,239 | 44,56,433 |
| Projects Account (Cr) | 3 | 43,68,931 | 39,78,339 |
| SBI - Bolero Vehicle Loan | | 12,225 | 2,13,666 |
| | | **83,10,155** | **86,19,207** |
| **APPLICATION** | | | |
| Fixed Assets less Depreciation | 4 | 32,58,717 | 37,41,590 |
| **CURRENT ASSETS, LOANS AND ADVANCES** | | | |
| Cash and bank balances | 5 | 46,73,546 | 48,15,627 |
| Loans and advances | 6 | 4,53,328 | 4,37,166 |
| (i) | | 51,26,874 | 52,52,793 |
| Less: Current liabilities | 7 | 75,436 | 3,75,176 |
| (ii) | | 75,436 | 3,75,176 |
| Net Current Assets (i) - (ii) | | 50,51,438 | 48,77,617 |
| | | **83,10,155** | **86,19,207** |
| Notes on Accounts | 10 | | |

As per our report of even date attached

**For FOUNDATION FOR ECOLOGICAL RESEARCH ADVOCACY AND LEARNING**

**R S BHALLA**
Managing Trustee

**SRINIVAS V**
Trustee

**FOR ASA & ASSOCIATES LLP**
Chartered Accountants

**K.VENKATRAMAN**
Partner
M.No:200/21914
Firm Reg No: 009571N

Place : Chennai
Date : 19.09.2014

FERAL CAMPUS

CAPSULES: STAYING FACILITY ON CAMPUS

FERAL CAMPUS


FERAL
http://www.feralindia.org