SÁLIM ALI CENTRE FOR ORNITHOLOGY AND NATURAL HISTORY

ANNUAL REPORT
2015-16

Published by

The Director
Sálim Ali Centre for Ornithology and Natural History,
Anaikatty, Coimbatore - 641 108, Tamil Nadu, India.
Phone : +91 422 2203100, 109
Fax : +91 422 2657088
Email : salimali@sacon.in, salimalicentre@gmail.com
URL : www.sacon.in

ANNUAL REPORT
2015-2016

Content

ORNITHOLOGY

CONSERVATION ECOLOGY

CONSERVATION BIOLOGY

It's a good thing to be recognised but I don't sort of begin to jump or dance. I feel all this talk about world-wide renown and so on is fictitious. In the context of world ornithology, the work we have done here is nothing. I feel like a frog in the well or a one-eyed man in the land of the blind.

Dr. Salim Ali
(1896 - 1987)

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Phone: 91 0422 2203100, 109, Fax: 91 0422 2657088, Email: salimali@sacon.in, salimalicentre@gmail.com,URL: www.sacon.in

अनिल माधव दवे
Anil Madhav Dave

राज्य मंत्री (स्वतंत्र प्रभार)
MINISTER OF STATE (INDEPENDENT CHARGE)
पर्यावरण, वन एवं जलवायु परिवर्तन
ENVIRONMENT, FOREST & CLIMATE CHANGE
भारत सरकार / GOVERNMENT OF INDIA

MESSAGE

Sálim Ali Centre for Ornithology and Natural History (SACON) was established in 1990, as a Centre of Excellence under the Ministry of Environment, Forest and Climate Change (MoEF & CC), with a mission "to help conserve India's biodiversity and its sustainable use through research, education and people's participation, with bird's at the centre stage" since its inception.

SACON has contributed immensely to the fields of Ornithology and Natural History by conducting research on various conservation issues in its mandated areas throughout the length and breadth of the country. The outcome of SACON's research has been instrumental in policy formulations and action plans for implementing authorities, both government and non-government organisations.

I am pleased to know that SACON is bringing out the Annual Report for the year 2015 – 16. A perusal of the Annual Report reveals that SACON has taken up several research projects in different biogeographic zones of India addressing varied research and conservation issues. It is heartening to note that while completing six research projects, the Centre has initiated ten new research projects alongwith many other ongoing projects. It is highly commendable that apart from the focus on bird oriented research such as 'studies on marine birds in the western coast of India at Sindhudurg', 'Owl assemblage and occupancy at Andaman archipelago, Forest Owlet in Central India', 'mapping key nesting sites of coastal and marine birds for identification of Ecologically Sensitive Areas along the Indian coasts, SACON is also conducting research studies on other taxa such as 'ecological species sorting in relation to habitat structure of small cat guild of Eaglenest Wildlife Sanctuary in Arunachal Pradesh' and 'organizational, behavioural and phylogeographical aspects of Nicobar long-tailed macaque on the Nicobar islands' during the year reporting.

SACON's efforts in providing management solutions for the conflicts between peafowl and farmers in Coimbatore district, Tamil Nadu; community oriented initiatives in Andaman & Nicobar Islands with respect to the conservation of Edible-nest Swiftlet; efforts to provide management solutions to various biodiversity and stakeholder related issues of Munnar High Range Mountain Landscape Area, Idukki district, Kerala and exploring biodiversity-mediated options for the enhancement of livelihood avenues of the stakeholders of Sompeta wetland, Srikakulam district, Andhra Pradesh elucidate the Centre's commitment towards community oriented approach in conducting conservation research.

I am also happy to know about the Ecotoxicological, Environmental Impact Assessment Studies and Nature Education programmes being carried out by the Centre. I am confident that SACON will carry forward its research programmes with commitment and dedication in the coming years for the benefit of science, society and the nation. I heartily congratulate SACON for accomplishing 25 years of yeoman service in research on conservation of India's birds and biodiversity.

(Anil Madhav Dave)

Paryavaran Bhawan, Jor Bagh Road, New Delhi-110 003
Tel.: 011-24695136, 24695132, Fax : 011-24695329

BACKGROUND

Sálim Ali Centre for Ornithology and Natural History (SACON) was established in 1990, as a Centre of Excellence, under the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India. The SACON Society, presided by the Honorable Minister for Environment, Forest and Climate Change (Government of India), is the apex body of SACON and the management of SACON is vested in a Governing Council, chaired by the Secretary to the Government of India, MoEF & CC. Realizing the significance of holistic approach in avian studies and conservation, the major objectives of SACON have been designed to cover the entire field of natural history focusing on Ornithology.

MISSION

Sálim Ali Centre for Ornithology and Natural History (SACON) was established in 1990, as a Centre of Excellence, under the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India. The SACON Society, presided by the Honorable Minister for Environment, Forest and Climate Change (Government of India), is the apex body of SACON and the management of SACON is vested in a Governing Council, chaired by the Secretary to the Government of India, MoEF & CC. Realizing the significance of holistic approach in avian studies and conservation, the major objectives of SACON have been designed to cover the entire field of natural history focusing on Ornithology.

OBJECTIVES

Design and conduct research in Ornithology, covering all aspects of biodiversity and Natural History

Develop and conduct regular courses in Ornithology and Natural History at the level of M.Sc., M.Phil., and Ph.D. and also short-term orientation courses in related subjects

Create a data bank on Indian Ornithology and Natural History, and disseminate knowledge relating to Ornithology and Natural History for the benefit of the community.

EXECUTIVE SUMMARY

The year 2015-16 was a landmark one in the annals of SACON. SACON entered into its Silver Jubilee year of existence. Silver Jubilee celebrations were inaugurated by Shri Prakash Javadekar, Hon'ble Minister of Environment, Forest and Climate Change, Government of India and President of the SACON Society on 28th January 2016 in a function at the SACON campus, Anaikatty, Coimbatore, attended by Shri Ashok Lavasa, Secretary to the Govt. of India, MoEF & CC, Shri P. K. Dash, Additional Secretary & Financial Advisor, MoEF & CC, Dr. Harpanahalli, Advisor, SACON, MoEF & CC, members of Sacon Governing Council and Society, Senior officials of Tamil Nadu Forest Department, and guests from sister organizations/Universities, Coimbatore. SACON has drawn up a detailed schedule of activities spanning the whole year to commemorate the Silver Jubilee year.

During the reporting year six of the research projects have been successfully completed while ten new projects were initiated. The Ornithology division has taken up a study on the mapping of key nesting sites of coastal and marine birds for identification of Ecologically Sensitive Areas (ESA's) along Indian coasts since the said nesting sites are recognized as one of the 11 key criteria employed to identify ESA's along the Indian coasts. Based on the study, a database of the nesting records including coastal heronries is being prepared. The Ornithology division continued its studies on the Owl assemblage and occupancy in Andaman archipelago, India. The study was initiated due to the paucity of information on distribution and abundance of endemic species and also in view of increasing anthropogenic pressure in Andaman Islands necessitated the management to identify and prioritize the habitats for their conservation. Assessing the status and distribution of avifauna within the coastal talukas of Sindhudurg District, Maharashtra is a pioneering study which aims to address the spatio-temporal patterns of avian diversity, and density and to explore the relationship between environmental variables and avian community. Altogether, 250 species of birds including 100 wetland associated species were recorded in the three coastal talukas of Sindhudurg district.

The Conservation Ecology division initiated a project to assess the Ecological status of Palk Bay, along the Ramanathapuram District, Tamil Nadu. Interim results indicated that it is biologically diverse and rich with 392 endemic species. The division has continued its study on the Conservation of the Andaman Serpent-eagle Spilornis elgini in the Andaman Islands: Phase-I. It was observed that Andaman Serpent-eagle is the most abundant raptor in Andaman Islands as compared to other raptors known from the area. Understanding dispersal patterns in the monomorphic Edible-nest Swiftlet of the Andaman Islands using biotechnological tools and status, ecology, and conservation of Narcondam Hornbill Aceros narcondami on Narcondam Island, India are the projects which are currently ongoing in Andaman and Nicobar Islands.

Conservation Biology division's study on the ecological species sorting in relation to habitat structure in the small cat guild of Eaglenest Wildlife Sanctuary, Arunachal Pradesh examines the role of morphology in spatial

distribution patterns and habitat associations in small and medium cats, the relationship between body size and diet among them and compares conventional techniques for surveying small carnivores for cost effectiveness, and has made considerable progress. The Forest Owlet Heteroglaux blewitti, belonging to a monotypic genus, is a Critically Endangered species endemic to Central India. Since the discovery of the species, the taxonomic placement of the species has been debatable. A study entitled 'Determining the taxonomic and conservation status of the Forest Owlet (Heteroglaux blewitti)' is an ongoing project during the year reporting with an objective to examine genetic connectivity between various populations, examine its molecular taxonomy and phylogeny with other owls and resolve the issue of possible hybridization with Spotted Owlet.

The Division has completed a study on the social organization, behaviour and phylogeography of Macaca fascicularis umbrosus on the Nicobar Islands, India. Results showed that the population has recovered from decline caused by tsunami, but it could not be ascertained whether it has reached stability because of the altered group structure. The study brings to light the effect of natural disasters on island occurring species. The project on spatio-temporal burrow use patterns by vertebrates in Keoladeo National Park, Bharatpur, Rajasthan, India, brought out interesting information about various aspects of the burrow systems and associated animals.

Landscape Ecology division made an 'Assessment of conflicts between peafowl and farmers in Coimbatore, Tamil Nadu' and suggested mitigating measures to tackle the issue. Three projects funded by UNDP entitled 'Study on ecosystem requirements of the Hornbills (Great pied, Malabar pied, Indian grey and Malabar Grey) in Munnar Landscape Project Area', 'Developing site-specific eco-restoration protocol based on existing community requirements in Munnar Landscape Project Area' and 'Land use and management plans for production landscapes in Munnar Landscape Area' were discontinued due to reasons beyond the control of SACON. However valuable secondary information were collected under these projects.

Ecotoxicology Division continued its activities related to the project 'Monitoring and surveillance of environmental contaminants in birds in India' by analysing specimens obtained from different parts of the country.

During the reporting period, Environmental Impact Assessment division has continued its assessment on the "Hara Wind power project" of CLP Wind Farms (India) Ltd. on wildlife including migratory birds and raptors at Harapanahalli, Davangere, Karnataka. The results showed that wind turbines do cause bird mortalities at the Hara wind farm area. The bat mortalities recorded were comparatively higher than that of birds. The Division also developed 'Management Plan of Fudam Bird Sanctuary, Diu'. The third project taken up by the Division entitled 'Plant- animal community studies in various landscape elements (Birds and Butterflies) in the Munnar High Range Mountain Landscape Area, Kerala', funded by UNDP was discontinued.

Since SACON firmly believes that it is essential to involve

local communities in conservation, Extension Division has initiated a project to document the biodiversity of Sompeta wetland, Srikakulam District, Andhra Pradesh and developing biodiversity- mediated livelihood options for local communities.

'Conducting baseline studies for Thane creek, Maharashtra' and 'Carrying out ecotoxicology of fishes, crabs and bivalves at Thane Creek, Maharashtra' were the two new studies taken up by the Wetland Ecology division. This is the first attempt to understand the above aspects of Thane creek, which was declared as " Flamingo Sanctuary" in 2015. The division developed a method for in situ estimation of Sexual Size Dimorphism (SSD) in Painted Storks through digital photographs, and identified the subtle difference in the bill length between the sexes which is an outcome of the project, 'Assessment of the morphological diversity and the ecological patterns in the near threatened colonial water birds across Indian sub-continent using novel approach' completed during the year.

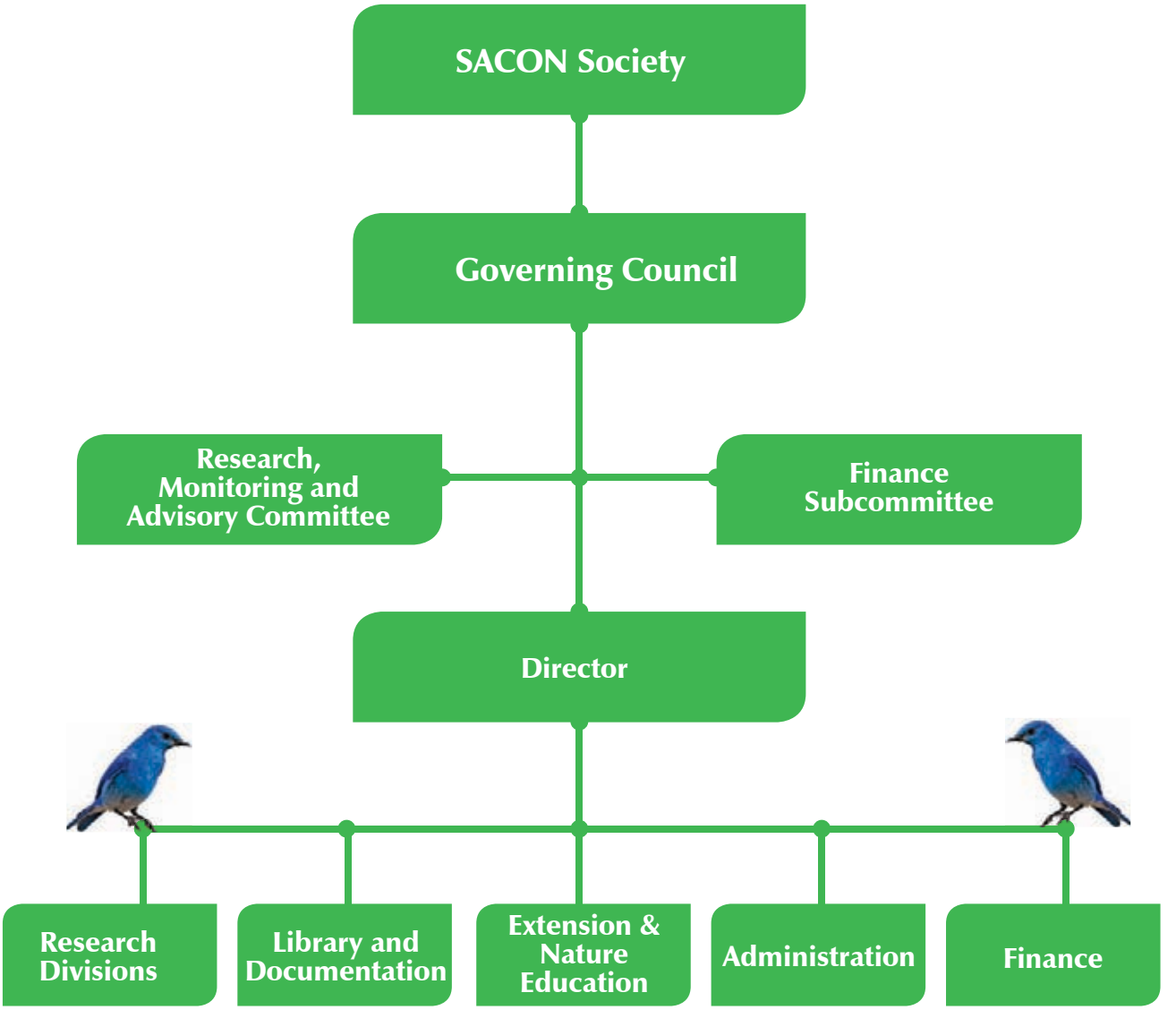
The project under Nature Education Division 'Exploring Nature through Birds' (ENTB) is aimed at developing a module for science communication for inculcating observation and documentation skills among children. The module contains three books and four posters. This resource material is now facilitating a participatory nature monitoring program designed for children and also helpful for bird watchers, nature enthusiasts, environmentalists and conservationists.

Twenty three nature awareness programmes for students were conducted in the campus. Sálim Ali Naturalist Forum (SANF) conducted five field programmes and five lectures during this period which include the bird watching and trekking programmes in forests in and around Coimbatore. As part of Sálim Ali Trophy Nature Competitions 2015-16 prize distribution ceremony was held at Central Academy for State Forest Service (CASFOS), Coimbatore. National Nature Camping programme is an initiative of the MoEF & CC in environmental education for children which is aimed at creating greater awareness, and understanding about the environment. Under this programme six camps were conducted for the school children and one camp was conducted for the 'special children'.

Apart from the research programmes, SACON has been intervening in skill development for different target groups employing the valuable technical expertise available with the Centre. A Summer training Programme on Laboratory Procedures on Ecotoxicological Studies was conducted for graduate students of various institutions. Another training programme on bird conservation and Environmental Impact assessment (EIA) was conducted for Forest Range Officer Trainees. Workshop on "Conservation Genetics" was conducted for participants of the Student Conference held in Bengaluru.

During the year an additional hostel building with a capacity to accommodate eight inmates was constructed with funds donated by M/S Pirojsha Godrej Foundation, Mumbai.

SACON - Organization Structure



SACON Society

The SACON Society comprises the President, the members of the Governing Council and experts in the field of Ornithology, Wildlife Sciences and Management. The Honourable Minister of Environment, Forest and Climate Change is the President of the SACON Society and the Director, SACON is the Member Secretary. The total members in the SACON Society are 29.

The 24th Annual General Meeting (AGM) of the SACON Society was held on 28th January 2015 at SACON, Coimbatore, Tamil Nadu which was presided by Shri. Prakash Javadekar, Honourable Minister of State for Environment, Forest & Climate Change (Independent Charge), Government of India & President, SACON Society.

SACON Society Members

Hon'ble Minister of Environment, Forest and Climate Change & President – SACON Society, New Delhi
Secretary to the Govt. of India, Ministry of Environment, Forest and Climate Change, New Delhi & Chairman – SACON (GC)
Financial Advisor Ministry of Environment, Forest and Climate Change New Delhi
Advisor, Govt. of India, Ministry of Environment, Forest and Climate Change, New Delhi
Principal Secretary to the Govt. of Tamil Nadu, Dept. of Environment and Forests, Chennai, Tamil Nadu
Director Wildlife Institute of India Dehra Dun
Vice Chancellor Bharathiar University Maruthamalai Road Coimbatore – 46, Tamil Nadu
Director Bombay Natural History Society Hornbill House, Sálim Ali Chowk Shaheed Bhagat Singh Road Mumbai - 400 02, Maharashtra
Dr. Renee Borges Chairperson Centre for Ecological Sciences Indian Institute of Science Bengaluru – 12, Karnataka
Dr. Erach Bharucha Director Bharati Vidyapeeth Deemed University Institute of Environment Education and Research Katraj-Dhanakawadi Pune - 411 043, Maharashtra
Prof. Bonny Pilo 204 Janardhan Apartments 14 Pratap Gunj Vadodara- 390 002

Dr. J. S. Samant, Professor (Retd.) Development Research Awareness and Action Institute (DEVRAAI) 'RAAI' - 379, R K Nagar Kolhapur – 416 013, Maharashtra
Prof. C. K. Varshney Emeritus Scientist School of Environmental Sciences Jawaharlal Nehru University New Delhi
Dr. K. N. Ganeshaiah University of Agricultural Sciences Department of Genetics and Plant Breeding, G. K. V. K. Bengaluru - 560 065, Karnataka
Prof. Anil K Gupta Professor Indian Institute of Management Vastrapur, Ahmedabad Gujarat – 380 015
Dr. K. Thiyagesan (Retd. Principal, AVC College) Chidambaram, Tamil Nadu
Dr. Rajah Jayapal Principal Scientist SACON Coimbatore, Tamil Nadu
Vacant
The Principal Secretary, Department of Environment and Forests, Govt. of Gujarat, Gandhinagar, Gujarat
The Principal Chief Conservator of Forests (Wildlife), Maharashtra Forest Department, Government of Maharashtra, Van Bhawan, Civil Lines, Nagpur, Maharashtra
The DirectorZoological Survey of India M Block, New Alipore Kolkata – 700 053 West Bengal
The Director, Silent Valley National Park, Mannarghat, Palghat, Kerala
Director Kaziranga National Park, Bokakhat, Distt. Golaghat, Assam -785612
Smt. Tara Gandhi A1 Uttaravedi No 7, 2nd Seaward Road Valmiki Nagar Chennai - 600 041, Tamil Nadu

Director G. B. Pant Institutute of Himalayan Environment and Development Kosi-Katarmal,Almora – 263 643, Uttarakhand

Dr. B. M. Parasharya AINP on Agricultural Ornithology Biological Control Research Laboratory Anand Agricultural University Anand – 388 110, Gujarat

Director Kerala Forest Research Institute Peechi P.O. Thrissur - 680 005
Kerala

Dr. Mohan Ram 174, SFS, DDA Flats, Mukherjee Nagar, Delhi – 110 009

Dr. S. Balachandran Dy. Director Bombay Natural History Society Hornbill House Salim Ali Chowk, Shaheed Bhagat Singh Road, Mumbai -400 023, Maharashtra

Mr. Ritesh Kumar Conservation Programme Manager Wetland International South Asia, A-25, Second Floor Defence Colony New Delhi – 110024

Dr. R. Sukumar Professor Centre for Ecological Sciences Indian Institute of Science Bengaluru – 12, Karnataka

Director SACON (Member Secretary)

Governing Council

The Chairperson of the Governing Council (GC) of SACON is the Secretary to the Government of India, Ministry of Environment, Forest and Climate Change (MoEF&CC). The GC has 16 members; Financial Advisor, MoEF&CC, Advisor, MoEF&CC or nominee, four ex-officio members, eight nominees of the Governing Council and the Director, SACON (Member Secretary). The tenure of the Governing Council is three years. The members of the GC are listed below:

Constitution
Secretary to the Government of India, or his nominee not below the rank of Additional Secretary, Ministry of Environment, Forest and Climate Change – Chairperson
Financial Advisor, MoEF&CC, or his / her nominee from the IFD of the MoEF&CC(Ex-officio)
Advisor, MoEF&CC, dealing with the matters of SACON, or his / her nominee (Ex-officio)
Principal Secretary to the Govt. of Tamil Nadu, Dept. of Environment and Forests, Chennai (Ex-officio)
Director, Wildlife Institute of India, Dehra Dun (Ex-officio)
Vice Chancellor, Bharathiar University, Coimbatore (Ex-officio)
Director, Bombay Natural History Society, Mumbai (Ex-officio)
The Chairperson, Centre for Ecological Sciences, Indian Institute of Science, Bengaluru (Ex-officio)
Three experts in the field of Ornithology [Nominees] Dr. Erach Bharucha, Director, Bharati Vidyapeeth Deemed University, Pune Prof. Bonny Pilo, Professor of Zoology (Retd.), M. S. University of Baroda Dr. J. S. Samant, Advisor and Trustee, Development Research Awareness and Action Institute, Kolhapur
Two experts in the field of Ecology or in disciplines of Natural History [Nominees] Prof. C. K. Varshney, Emeritus Scientist School of Environmental Sciences, Jawaharlal Nehru University, Delhi Dr. K. N. Ganeshaiah, University of Agricultural Sciences, Bengaluru
One faculty from Management Institutes [Nominee] Dr. K. Anil Gupta, Professor, Indian Institute of Management, Ahmedabad
One representative from public sector enterprises / banks [Nominee] Vacant
Director, SACON (Member Secretary)

The 67th meeting of the Governing Council was held on 16 June 2015 at SACON, Coimbatore.

Research, Monitoring and Advisory Committee (RMAC)

The mandate of the RMAC is to i) to act as an advisory body to the faculty of SACON, ii) review research proposals developed by the Centre, iii) review and assess projects being implemented, and monitor the output; dissertations, reports, papers in scientific journals and other publications, and iv) conduct a review annually of all research and extension activities of the Centre and advise changes, if any. The panel of the Committee is given below.

Dr. A. R. Rahmani, Director, Bombay Natural History Society, Mumbai (Chairman)

Chief Wildlife Warden, Tamil Nadu or nominee (Ex-Officio member)

Chief Wildlife Warden, A & N Islands or nominee (Member)

Chief Wildlife Warden, Kerala or nominee (Member)

Deputy Inspector General of Forests Wildlife, MoEF&CC, New Delhi (Ex-Officio member)

Prof. Mewa Singh, Department of Psychology, Mysore University (Member)

Dr. P. S. Easa, Director, Kerala Forest Research Institute, Peechi (Member)

Prof. B. C. Chovdhury, Scientist (Retd.), Wildlife Institute of India, Dehra dun (Member)

Dr. E. J. James, Distinguished professor , Karunya University, Coimbatore (Member)

Mr. R.S.C. Jayaraj IFS, Director, Rain Forest Research Institute, Jurhat, Assam (Member)

Dr. K. Thiyagesan, Principal (Retd.), AVC College, Mayiladuthurai, Tamil Nadu (Member)

Dr. P. Balasubramanian, Principal Scientist, SACON (Member)

Director, SACON (Member Secretary)

The 28th meeting of the Research, Monitoring and Advisory Committee was held on 26 June 2015 at SACON, Coimbatore.

Staff of SACON

The core scientific staff strength of the year (until March 2016) was 15; Director (1), Senior Principal Scientist – I (1), Senior Principal Scientist - II (2), Principal Scientist (6), Senior Scientist (2) and Scientist (3).

Scientific

Director	Dr. P. A. Azeez (till 6th March 2016) Dr. K. Sankar (from 7th March 2016)
Ornithology	Dr. Rajah Jayapal, Principal Scientist Dr. S. Babu, Scientist
Avian Physiology and Genetics	Dr. R. P. Singh, Scientist
Conservation Ecology	Dr. P. A. Azeez, Senior Principal Scientist – I Dr. S. Manchi Shirish, Senior Scientist
Conservation Biology	Dr. Shomita Mukherjee, Principal Scientist Dr. H. N. Kumara, Senior Scientist
Landscape Ecology	Dr. P. Balasubramanian, Senior Principal Scientist - II Dr. P. V. Karunakaran, Principal Scientist
Ecotoxicology	Dr. S. Muralidharan, Senior Principal Scientist - II
Environmental Impact Assessment	Dr. P. R. Arun, Principal Scientist
Wetland Ecology	Dr. Goldin Quadros, Senior Scientist Dr. M. Mahendiran, Scientist
Extension	Dr. Mathew K. Sebastian, Principal Scientist
Nature Education	Dr. P. Pramod, Principal Scientist

Technical

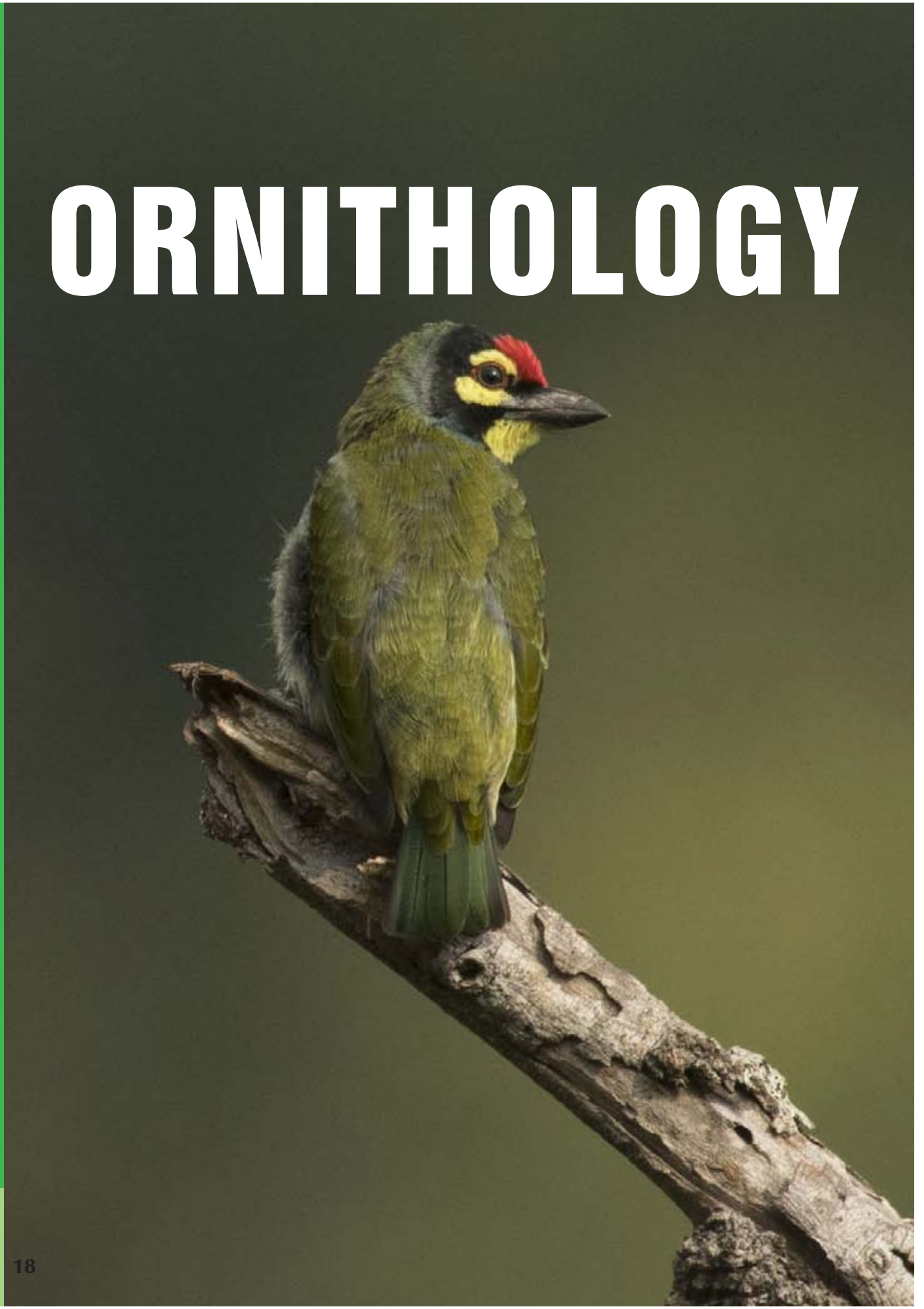
Library and Documentation	Mr. M. Manoharan, Library Assistant

Administration &Finance

Finance Officer	Mr. Aneesh K. Abraham
Junior Administrative Manager	Mr. R. Jayakumar
PA to Director	Mr. V. Vaidiyanathan
Accountant	Mr. M. Muthupandi

Administrative Assistant	Mr. S. Patturajan
Office Assistant	Mrs. R. Rajalakshmi
Stenographer	Mr. M. Eanamuthu
Receptionist	Mrs. M. Jayageetha
Site Engineer	Lt. Col. (Retd.) N. Sundararaj (on contract)
Drivers	Mr. R. Ravi and Mr. P. Subramanian
Office Attendants	Mr. A. Devaraj and Mrs. V. Santhalakshmi

ORNITHOLOGY



Mapping Key Nesting Sites of Coastal and Marine Birds for Identification of Ecologically Sensitive Areas Along Indian Coasts

Important nesting sites of coastal and marine birds have been recognized as one of the 11 key criteria employed to identify Ecologically Sensitive Areas (ESAs) along the Indian coasts. We undertook a study to collate information on nesting sites of birds along India's seaboard, prioritize sites based on their conservation significance, and map their extent with boundaries.

In total, 56 species of coastal and marine birds that are known to regularly nest along the Indian coasts were short listed and 708 records of their nesting from both published and unpublished sources were collected. Our database also includes site names, geographical coordinates, microhabitat type, abundance of birds, nesting information, number of nests, and protection status of nesting sites. Based on these criteria, a prioritization algorithm was developed to identify and shortlist the nesting sites for recommendation as potential ESAs.

Our database contained the most number of nesting records for coastal heronries (259), followed by mangroves and littoral forests (137), woods on seaboard (107), seashore and sandbank (51), and coastal caves (39). Geographically, data on coastal nesting sites of birds were largely from Andaman & Nicobar Islands (145) followed by Odisha (128) and Andhra Pradesh (65). Nicobar Megapode Megapodius nicobariensis (92 records), White-bellied Sea Eagle Haliaeetus leucogaster (85), and Edible-nest Swiftlet (26) are predominant among the 56 species of nesting birds from coastal and marine habitats .

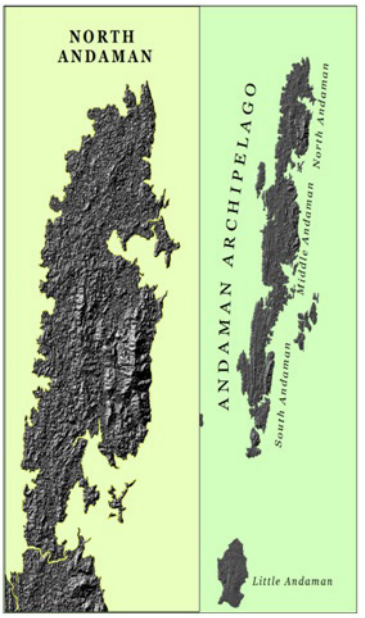
Based on the multiple criteria, 90 sites were prioritized to be considered as Ecologically Sensitive Areas along the Indian coasts. Mangroves and littoral forests (52 sites) followed by coastal caves (17 sites) were represented the most in the prioritized sites. The highest number of sites are from Andaman & Nicobar Islands (62) followed by Maharashtra and Tamil Nadu (5 each). Of the 90 sites, 67 are Protected Areas (PA) and 23 are located outside PAs. Using habitat-based algorithm in Google Earth Pro and 1:50,000 SoI toposheets, exact boundaries of prioritized sites were demarcated and shape files were extracted for overlaying with master spatial database maintained at NCSCM.

Dr. Rajah Jayapal, rajah.jp@gmail.com

Principal Investigator : **Dr. Rajah Jayapal**
Co-PIs : **Dr. S. Babu, Dr. P. A. Azeez, Dr. Goldin Quadros**
Research Fellows : **Mr. N. Mohamed Ibrahim, Ms. V. Gayathri**
Collaborating Agencies : **National Centre for Sustainable Coastal Management (NCSCM)**
Project Duration : **1 Year**
Budget : **`4,25,000/-**
Funding source : **National Centre for Sustainable Coastal Management (NCSCM)**
Current Status : **Ongoing**

Owl Assemblage and Occupancy in Andaman Archipelago, India

Due to paucity of information on distribution and abundance of endemic species and also in view of increasing anthropogenic pressure in Andaman Islands necessitates that management shall identify and prioritize the habitats for their conservation. In this context, we identified factors influencing the assemblage and occupancy of owls in Andaman Islands. Point count method was adapted with three sampling protocols viz., listening to spontaneous calls, broadcasting of conspecific calls and spotlight searches. In each of owl census point, habitat diversity of offshore islands was assessed at structural class level using Point Centered Quarter method. Site occupancy framework was followed to identify the covariates that influence detection probability and occupancy of owls. Four km2 spatial grids were considered as individual sampling unit; however, alternative grids were sampled. In all selected grids, owl sampling was conducted using protocols that are developed earlier. In addition, sampling and site covariates were also quantified in all owl census points.



From the road survey data, we assessed composition of owls in different landcover types using multi-response permutation procedure (MRPP). The composition of owls in Andaman was significantly different among the land cover types (observed delta = 0.2349; expected delta = 0.2515; significance of delta = 0.001) and different degrees of logging intensity. In all the combinations, the composition of owls was found to be significantly different. During the reporting period, we covered 50 offshore islands of various sizes. In nine islands, no owls were recorded. Oriental Scops Owl was detected in 41 islands (82% islands). The Andaman Barn Owl was recorded from 11 offshore islands. Andaman Scops Owl was recorded from less number of islands (6 islands). Among the various census methods, encounter rate was higher for Hume's Hawk Owl and Andaman Scops Owl during the call playback method while it was higher for other species during spontaneous calls. The detection probability of owls was 0.03 for Barn Owl, 0.54 for Andaman Scops Owl, 0.67 for Andaman Hawk Owl, 0.77 for Hume's Hawk Owl and 0.79 for Oriental Scops Owl. Except for Barn Owl (0.11), Andaman scops owl (0.89), Andaman Hawk Owl (0.95), Hume's Hawk Owl (0.96) and Oriental Scops Owl (0.98) had high naïve occupancy. This indicates that the Andaman Hawk Owl and Andaman Scops Owl are locally rare but at larger fraction of unit, they are common.

From the results of preliminary analysis, it is found that selective logging of trees for domestic consumption in Andaman Islands may have negative impact on the population of certain endemic owls.

Principal Investigator: **Dr. S. Babu**
Co-PIs : **Dr. H. N. Kumara**
Research Fellows : **Mr. S. Suresh Marimuthu**
Project Duration : **3 years**
Budget : **`32,43,000/-**
Funding source : **SERB-DST**
Current Status : **Ongoing**

Dr. S. Babu, sanbabs@gmail.com

Assessing The Status and Distribution of Avifauna Within The Coastal Talukas of Sindhudurg District, Maharashtra

The project aims to address the spatio-temporal patterns of avian diversity and density and to explore the relationship between environmental variables and avian community. In addition, the study also assesses the nesting success of terns in Burnt Island and White-bellied Sea-eagles (WBSE) along the coastal stretch. Based on the results, study intends to develop a long-term monitoring protocol for birds in the Sindhudurg coast, Maharashtra. To achieve these aims, seven estuaries and two human modified habitats (Saltpan and Aquaculture ponds) were identified for quantifying the shorebirds and habitat parameters in the Sindhudurg district.

Altogether, 250 species of birds (100 wetland associated species) were recorded in the three coastal talukas of Sindhudurg district. Among them, 13 were globally threatened. In total, 28 species of true shorebirds were recorded hitherto. Lesser and Greater sand plovers are common and abundant. Site wise species richness indicates that more number of wetland dependent species were recorded from Mithbav and Shiroda sites. The Shannon-Weiner diversity index showed that Niviti and Achara stations had high diversity value while the lowest value was recorded in Rock garden. Diversity and species richness of coastal birds were reaching a peak during January and February and then it falls down during June. Out of five species of gulls, brown-headed gull accounted for 17% of 1% of biogeographic population in the Sindhudurg coast. Around 5% of 1% of biogeographic population of Pallas's gull was recorded. A total of 46 nests of WBSE were recorded. Maximum number of nests of WBSE was recorded from the Malvan Taluka. Most of the nests were recorded on Casuarina trees. In an initial counting, around 6,223 individuals (including juveniles) of Greater Crested Tern, 12 individuals of Roseate Tern, eight individuals of Sooty Tern were observed during first visit. Five nature trails (Wadatar creek, Mithbav creek, Hadi, Karli creek, and Vengurla Bunder) covering three talukas have been identified with emphasis on having a comprehensive nature trail. The Sarpanch of the village along with the UNDP team member Ms. Daya facilitated the workshop that was held on 20th October, 2015. The workshop had 12 individuals that included five female participants.

Most of the WBSE nests are found in private lands. Increasing tourism, without proper management, may cause negative impact on the nesting trees of WBSE and the habitats of shorebirds along the Sindhudurg district. Data on physico-chemical analysis of water, may reveal the impact of tourism on the bird distribution and habitat use.

Dr. S. Babu, sanbabs@gmail.com

Principal Investigator: **Dr. S. Babu**
Co-PI : **Dr. Goldin Quadros**
Research Fellows : **Mr. G. Babu Rao, Mr. V. Anoop, Mr. Mayur Sarang,Mr. Rajan Surve**
Project Duration : **2 Years**
Budget : **`28,18,000/-**
Funding source : **GOI-UNDP-GEF Mangrove Cell, Mumbai**
Current Status : **Ongoing**

CONSERVATION ECOLOGY

Annual Report 2015-16

SACON

Ecological Status Assessment of Palk Bay, Tamil Nadu

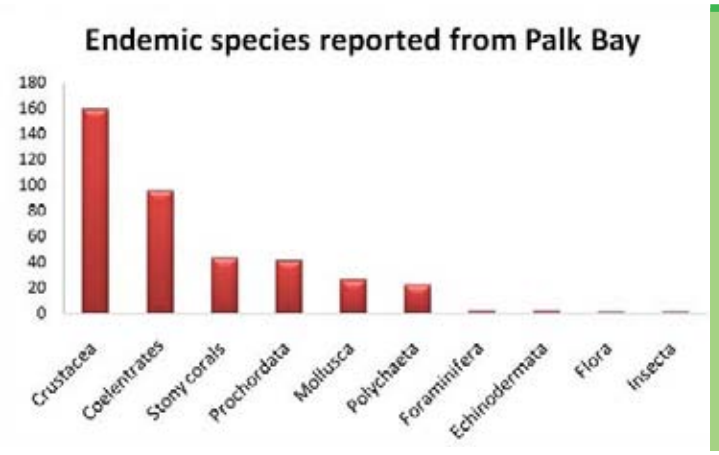
The objective of the study, a rapid ecological baseline survey is based on the conceptual Framework for baseline study on the ecological status of the pilot sites for the CMPA Project by the Leibniz Center for Tropical Marine Ecology, contextualized for Palk Bay. The study area is the Palk Bay along the Ramanathapuram District, Tamil Nadu. The methods include demarcation of the study area, laying grids up to 200 m from the coast, and quadrates for mangroves, benthos, seagrasses, and corals. Data on habitat distribution, birds, insects, reptiles and the local knowledge among the fishers were collected. Mangroves were examined from 92 grids by plotting 10 x 10 m quadrates. Birds were counted using point count method. Herpatofauna and insects were recorded opportunistically. A questionnaire survey was used in thirty two villages to understand the perception of the fishers.

We have completed the literature survey, mapping the area, and survey on habitats, bird, reptiles and insects. The area is biologically diverse and rich with 392 endemic species. Survey along the entire coast showed presence of mangroves mostly in the northern part of the Palk Bay. Of the 26 mangrove and associate species, Avicennia marina was dominant. The highest density of mangrove trees was in Odavayal.

One hundred and thirty species of birds were recorded from 62 locations, of these, only six species were most commonly sighted along the entire coast. Only two species were common along eight habitats while five species were common in seven habitats. Nine species of reptiles (six lizards, two snakes and one turtle) were recorded. Totally 27 species of insects and five of arachnids were recorded from the mangroves. The arachnids comprised of five species of spiders, while the insects included Lepidopterans, Mantids, Odonates, Hymenopterans and Coleopterans. Lepidopterans were the most observed group with 12 species, followed by seven species of Odonates.

Regarding the fishers response from the questionnaire, we found that majority of respondents were of opinion that the ecological habitats, seagrass and corals are important for fishery. Only 10% reported of sighting Dugongs, 21 % Dolphins and 4% Sharks. High incidence of turtles trapped in fishing nets were reported.

Dr. P. A . Azeez, azeezpa11@gmail.com



Principal Investigator : **Dr. Rajah Jayapal**
Co-PIs : **Dr. S. Babu, Dr. P. A. Azeez, Dr. Goldin Quadros**
Research Fellows : **Mr. N. Mohamed Ibrahim, Ms. V. Gayathri**
Collaborating Agencies : **National Centre for Sustainable Coastal Management (NCSCM)**
Project Duration : **1 Year**
Budget : **`4,25,000/-**
Funding source : **National Centre for Sustainable Coastal Management (NCSCM)**
Current Status : **Ongoing**

Understanding Dispersal Patterns in The Monomorphic Edible-Nest Swiftlet of The Andaman Islands Using Biotechnological Tools

The project has the following objectives:

- To understand function of sex in dispersal (gross and natal) and natal philopatry in edible-nest Swiftlet
- To investigate function of the colony size in dispersal (gross and natal) and natal philopatry in edible'nest swiftlet
- To examine function of the inter-colonial distance and individuals' morphometry in its dispersal

Principal Investigator : **Dr. S. Manchi Shirish**
Co-PIs : **Dr. Ram Pratap Singh**
Research Fellows : **Yet to be engaged**
Project Duration : **3 Years**
Budget : **`45,78,000/-**
Funding source : **Department of Biotechnology, Govt. of India**

We have initiated the process of engaging research personnel and procurment of field equipment required for the project.

Dr. S. Manchi Shirish, ediblenest@gmail.com

Status, Ecology and Conservation of Narcondam Hornbill Aceros Narcondami on Narcondam Island, India

Principal Investigator : **Dr. S. Manchi Shirish**
Research Fellows : **None**
Project Duration : **18 Months**
Budget : **`6,07,000/-**
Funding source : **MoEF & CC**
Current Status : **Ongoing**

A major aim of the study is to understand the status, biology and habitat requirements of Narcondam Hornbill to develop appropriate conservation measures/strategies for the species and its habitat on the Narcondam Island. The project was initiated during November 2010 with the following objectives: 1. to investigate population status of the Narcondam Hornbill, 2. to study the nesting and foraging habitat requirements of the Narcondam Hornbill, 3. to study breeding and non-breeding biology of the Narcondam Hornbill and 4. to identify threats, formulate and advocate conservation measures.

The project period got extended for several unavoidable reasons. The project work could not be continued because of lack of funds. The funding agency (MoEF&CC) was approached for the continuation of the on-going project and release of further grant installments. On 29th December 2015, project period was extended till December 2016 by MoEF&CC. Subsequently, the Andaman Forest Department was approached for the permissions to continue the research on the Narcondam Island. The permission is yet to be received. Once the permissions from the forest department are received, the Coast Guard will be approached for the travel assistance to and from the Narcondam Island. Soon after the permits received, the project work will be initiated.

Dr. S. Manchi Shirish, ediblenest@gmail.com

Conservation of The Andaman Serpent-Eagle Spilornis Elgini in The Andaman Islands: Phase-I

The project was initiated during December 2015 to address the following objectives: 1. Estimate population abundance and distribution of the Andaman Serpent-eagle (ASE) on the large islands in Andaman, 2. Identify potential threats to the Andaman Serpent-eagle in the Andaman Islands and 3. Recommend conservation measures for the betterment of the study species and also identify the key sites for implementation of Phase – II.

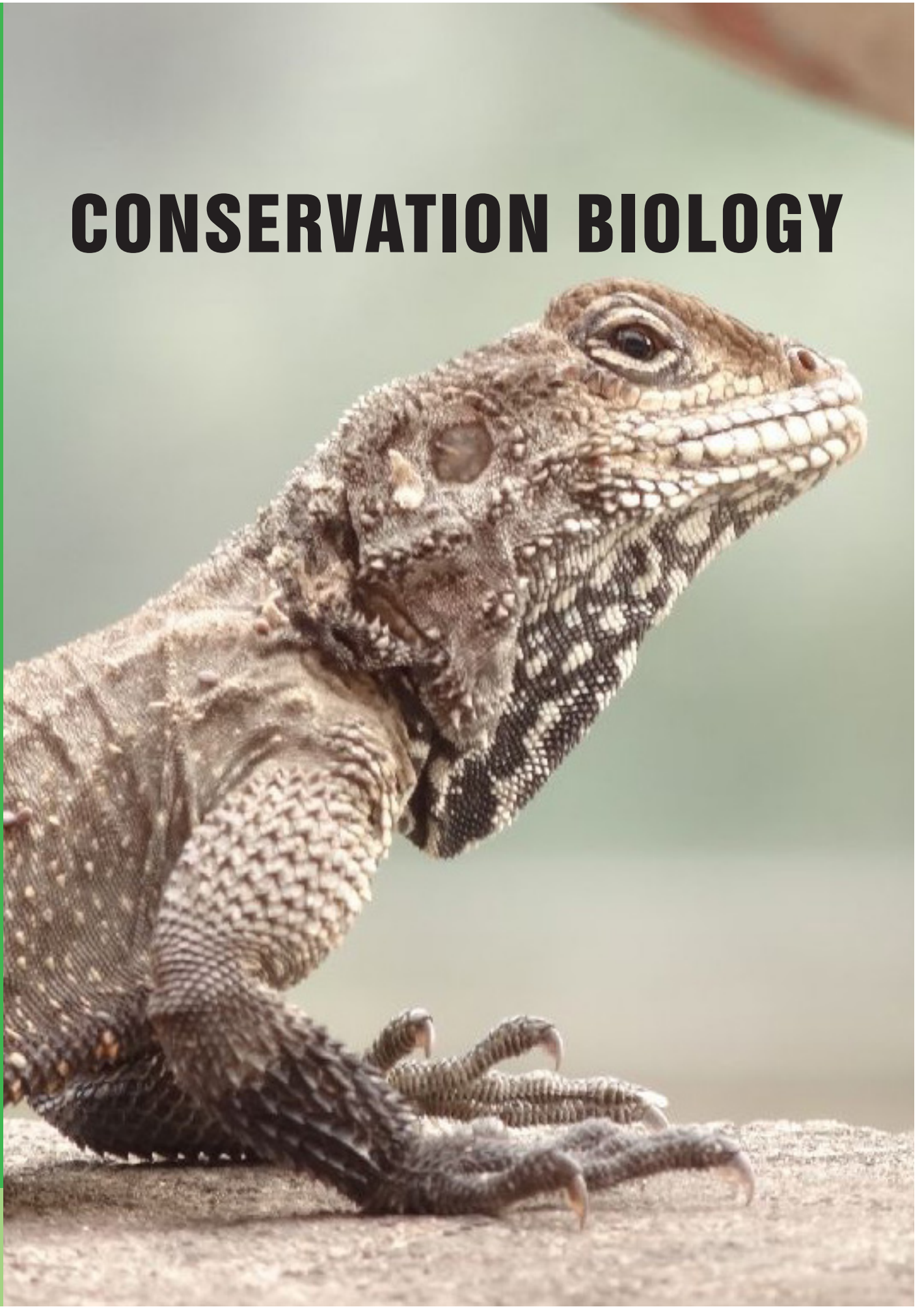
We walked 281 transects of various lengths (Range: 0.069 km to 1.42 km) covering total length of 381 km. It was observed that Andaman Serpent-eagle is the most abundant raptor in Andama Islands (Encounter Rate = 0.22 and Detection probability = 0.28) compared to the other raptors known from the area. The Andaman Serpent-eagle was present in all the habitats; Evergreen Forest, Semievergreen Forest, Deciduous Forest, Littoral Forest, Mangrove Forests, Plantation and Agriculture land. The species occurred more frequently in Deciduous (37%) and Semi-Evergreen (19%) Forests. During the study, only one nest of the Andaman Serpent-eagle was recorded in Mangroves of the Middle Andaman Islands.

We conducted 63 interviews with forest dwellers (people living in the hamlets around forest area) through a questionaire and compiled their views. As per the perspective of the 53% forest dwellers, there is no change in serpent eagles population in last ten years. Whereas, around 33% do think that there is a decrease in ASE population. Further, 61% of the interviewed, consider ASE and Crested Serpent-eagle (CSE) as a significant threat to their poultry along with Changeable Hawk-eagle (CHE) that has been claimed to be a voracious feeder of poultry by 95% of respondents. The frequency of attacks is about 1-2 fawls a day in a neighbourhood in the dry season that is a significant loss for forest dwellers. Hence, no surprise that trapping and hunting of these species are practised to minimise the loss of poultry. Almost 70% of respondents agree of trapping and hunting activities going on in their area. Around 32%, people accepted of tasting ASE/ CSE meat that gives every reason to believe that these species are vulnerable to high hunting pressure.

Dr. S Manchi Shirish, ediblenest@gmail.com

Principal Investigator : **Dr. S. Manchi Shirish**
Research Fellows : **Ms. Shivkumari Patel**
Project Duration : **2 Years**
Budget : **`11,56,000/-**
Funding source : **Raptor Research and Conservation Foundation, Godrej & Boyce Premises-1st Floor, Old Mumbai Gas Work Lane, Lalbaug, Parel, Mumbai 400012.**
Current Status : **Ongoing**

CONSERVATION BIOLOGY



Annual Report 2015-16

SACON

Ecological Species Sorting in Relation To Habitat Structure in The Small Cat Guild of Eaglenest Wildlife Sanctuary, Arunachal Pradesh Nine of The 15 Species of Felids

Nine of the 15 species of felids found in India occur in the North- East, perhaps the richest anywhere in the world. Cat morphology frequently indicates evolutionary origins with long tails suggesting arboreality and short tails, adaptation to open habitats. Yet, literature suggests considerable flexibility in the choice of habitats by most felids. We propose to explore if felid morphology is strictly related to habitat structure, facilitating co-existence particularly in a high diversity region. This project aims to study this in Eaglenest Sanctuary in the West Kameng district of Arunachal Pradesh, through non-invasive sampling using scats, molecular tools, camera trapping and spatial analysis on the GIS platform.

We recorded presence of felids through camera-trapping and DNA-based identification of scats. We deployed 30 cameras in various formats for comparison. We collected scats and used molecular techniques to assign them to species. Assigned scats were analysed for prey remains which were identified under a dissection microscope. Bootstrap means and Confidence Intervals for the percentage of scats with particular prey remains were computed for comparisons.

From a total effort of 7863 camera trap nights we had 106 camera-trap captures (1.3% success) of the four felids including four morphs of Golden Cat. An additional morph of Golden Cat was photographed which is melanistic (Figure 1). A pair of Golden Cats and a pair of Marbled Cats were photographed during January 2016. This could be suggestive of the breeding season for these species since they are otherwise solitary. There have been no photo-captures or identified scats of Jungle Cat from the Eaglenest area.

Of the 451 scats collected, 364 scats have been analysed for predator identity and 245 (67%) were assigned to felids. Of those assigned to felid species, 241 scats were of Leopard Cat, 2 of Golden Cat, 1 of Clouded Leopard and 1 of House Cat. Results of overall diet of Leopard Cat from 76 scats showed a predominance of mammalian prey. We were able to differentiate four species of rodents from the prey remains. Rattus andamanensis (putative identity) was the most commonly eaten followed by a species of vole. An unidentified insectivore species was also eaten (Figure 2& 3).

Figure 2. Dentition of prey found in scats of leopard cat. A & B: suspected Rattus andamanensis (upper and lower jaw); C: a species of Vole; D, E: Unknown rodents; F: Species of insectivore. Scale on image = 2 mm.

Figure 3: Diet of Leopard Cat in Eaglenest Wildlife Sanctuary and Community Reserve. Means with Bootstrap Confidence Intervals.

Dr. Shomita Mukherjee, shomitam@gmail.com

Principal Investigator : **Dr. S. Manchi Shirish**
Research Fellows : **Ms. Shivkumari Patel**
Project Duration : **2 Years**
Budget : **`11,56,000/-**
Funding source : **Raptor Research and Conservation Foundation, Godrej & Boyce Premises-1st Floor, Old Mumbai Gas Work Lane, Lalbaug, Parel, Mumbai 400012.**
Current Status : **Ongoing**

Determining The Taxonomic and Conservation Status of The Forest Owlet (Heteroglaux Blewitti)

The Forest Owlet Heteroglaux blewitti, belonging to a monotypic genus, is a Critically Endangered species endemic to Central India. Since the discovery of the species, the taxonomic placement of the species has been debatable.

The aim of the study is to examine genetic connectivity between various populations, examine its molecular taxonomy and phylogeny with other owls and resolve the issue of possible hybridization with Spotted Owlet. Since April 2015, three additional nuclear genes were sequenced bringing the total sequence length to a maximum of 4100bp.,1700 bp from mitochondrial genes (Cytochrome b and Cytochrome Oxidase I) and 2400 bp from nuclear DNA (RAG-1, TGFB2, MYO, LDH). Results suggest that the Forest Owlet is either a member of or very closely related to the Athene clade (Figure 1).

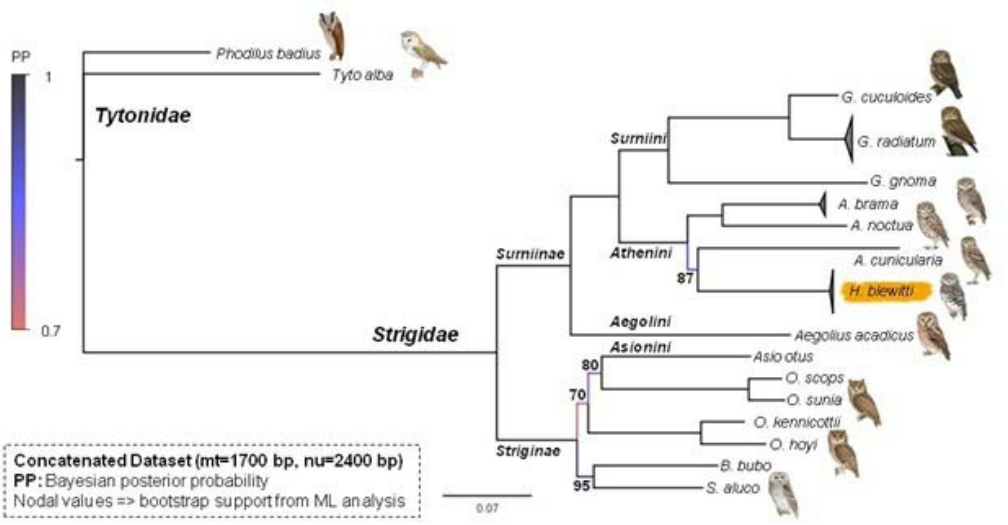


Figure 1

We are in the process of procuring samples/data from the Madagascar White-browed Owl, Athene superciliaris, the only member of the Athene clade not represented in our analysis, to complete the Athene-Heteroglaux phylogeny.

Results to date, showed that Forest Owlet and Spotted Owlet are not sister species as earlier believed. The Spotted Owlet is sister to the Little Owl. Hybridisation was not detected through phylogenetic analysis using nuclear and mtDNA.

To validate the niche model constructed during 2015, we surveyed 45 localities in nonprotected areas of Eastern Gujarat in March 2016 that had a high probability (> 0.7) of presence as predicted by the model. We detected presence in two localities in the Dang District.

This survey was rapid and we expect to find additional localities of presence in South Eastern Gujarat- a hotspot predicted by the model.

Additionally, we expanded the climate models to cover historical scenarios through past climate distribution modeling to understand the former distribution of the species.

These results indicate that it was approximately 22 thousand years ago (22 KYA), during the Last Glacial Maxima (LGM) that the climatic niche of the species was severely reduced. During the Last Interglacial (~120 KYA), the suitable climatic niche of the species spanned Central India, parts of Western Ghats and Eastern Ghats (Figure 2).

Principal Investigator : **Dr. Shomita Mukherjee**
Co-PIs : **Dr. V. V. Robin**
Dr. Prachi Mehta
Research Fellows : **Pankaj Koparde**
Collaborating Agencies: **National Centre for Biological Sciences, Bengaluru and Wildlife Research and Conservation Society, Pune**
Project Duration : **3 Years**
Budget : **`30,52,000/-**
Funding source : **Department of Biotechnology, India**
Current Status : **Ongoing**

Figure 1: Phylogenetic tree of the Athene clade showing evolutionary relationships within the group and with the closely related Glaucidium clade, with 10 samples of Forest Owlet (Heteroglaux blewitti shaded in orange), 6 Spotted Owlets (Athene brama) and 4 Jungle Owlets (Glaucidium radiatum) to generate 4100 base pairs of data for each species. Sequence data on other species were obtained from published sources.

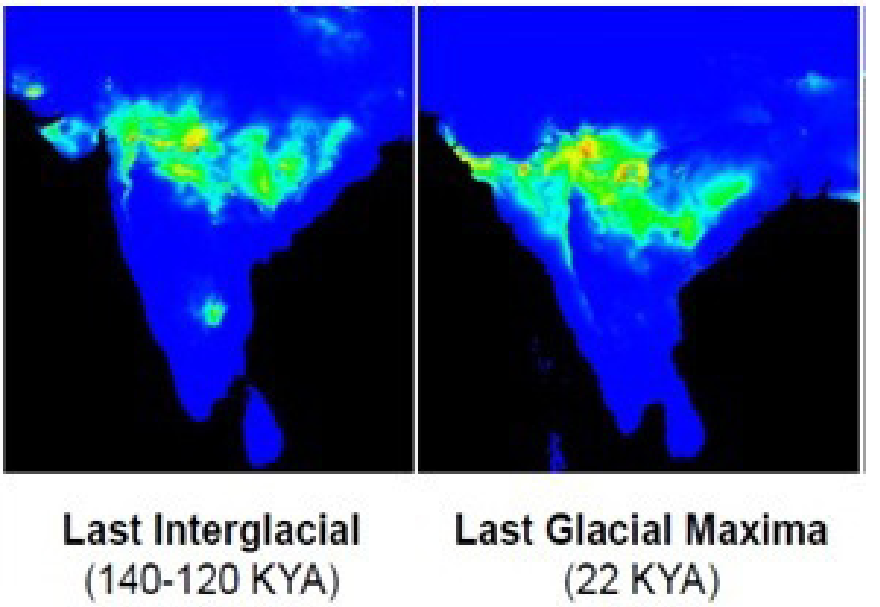


Figure 2

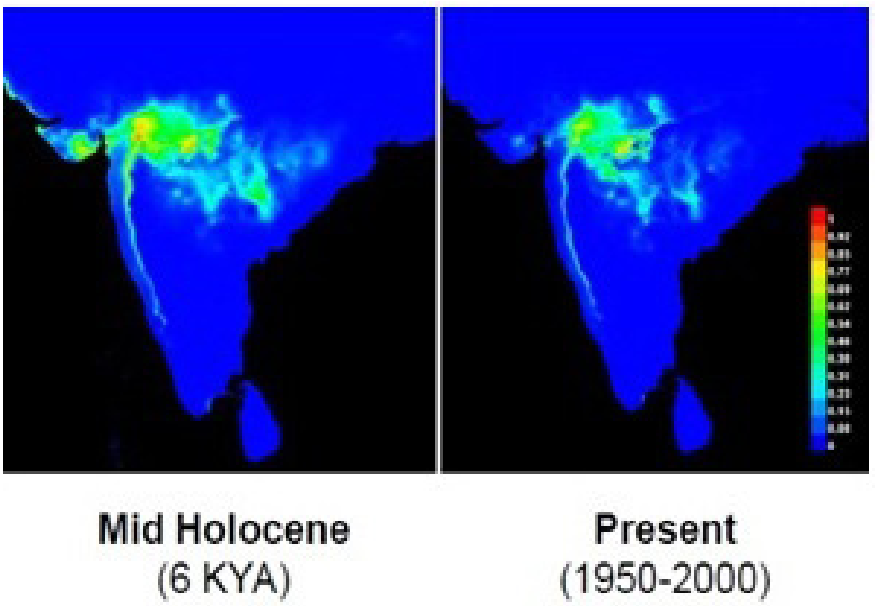


Figure 2. Historical distribution of Heteroglaux blewitii, using the following variables: temperature seasonality, mean temperature of coldest quarter, mean temperature of driest quarter and precipitation seasonality. These variables had contributed maximally in determining the current climatic niche of the species.

Dr. Shomita Mukherjee, shomitam@gmail.com

Spatio-Temporal Burrow Use Patterns By Vertebrates in Keoladeo National Park, Bharatpur, Rajasthan

The study was initiated to determine burrow dwelling animal assemblage (in terms of species richness and abundance) in Keoladeo National Park (KNP), Bharatpur, Rajasthan and understand (spatio-temporal) factors influencing their composition and activity, especially emergence and retreat into their burrow.

In all, 44 burrow systems were recorded in KNP during the present study. The porcupines avoided grid cells with percent water cover ([]1=-12.28±9.94SE), and selected areas closer to the park's boundary surrounded by agricultural fields ([]1=-9.02±4.52SE) with higher elevation ([]1=8.57±5.10SE) for burrow sites. The findings, brought about how the burrow systems have been strategically placed in the landscape and the factors determining the burrow site selection by Indian crested porcupines. In all, 104 openings were found (range 1 - 8 ; X ± SD = 2.36 ± 1.4). Of all burrow systems, 16 (36.36%) had one opening, 28 burrow systems had two or more openings with mean inter-

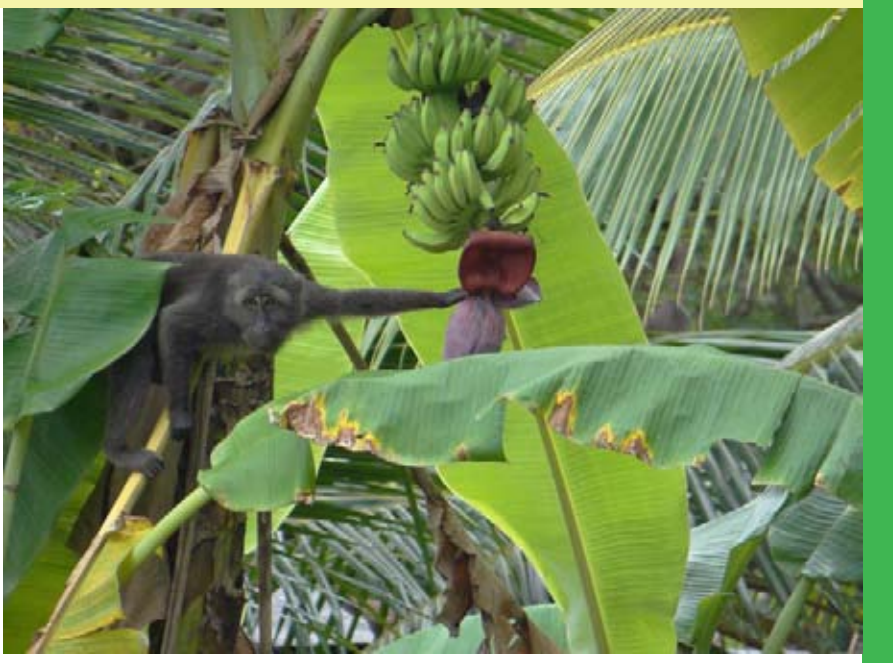
opening distance of 5.09 ± 3.00 m (range=0.3-14.0 m, n=129). Mean radius and area of 64 burrow openings measured 17.40 cm (range=9.19-33.46 cm) and 952 cm2 (range=266-3520 cm2) respectively. Barring seven vertical or plunge holes, compass orientation of 97 openings had mean vector (μ) of 122°±111° (mean±circular-SD) and mean vector length (r) of 0.15. The Rayleigh-Z-test showed that the orientation of burrow openings were randomly distributed without any trend (Z=0.722; p>0.001).

The internal architecture (n=9) of the burrow systems was characterised by tunnels (width=0.2-0.5m; height=0.1- 0.5m) interspersed with chambers (width=0.5-1.5m; height=0.15-0.5m) at intervals. For all systems combined, total length and above ground area of burrow system averaged 13.33±6.51m and 18.81±9.92 m2 respectively. Camera Trapping of 21 burrow systems (36 openings) with a total of 1710 trap days (in 2 years) across all openings and continuous monitoring was used to calculate the mean detection per day in a month by burrow using animals mainly porcupine (highest-November, 3.69 ± 0.72), python (highest-January,1.00±0.49), jackal (highest-January,0.76±0.33) and bat (highest-April,0.52±0.21).

Dr. H.N. Kumara, honnavallik@gmail.com

Principal Investigator: **Dr. H. N. Kumara**
Late Dr. S. Bhupathy
Co-PI : **Dr. Shirish Manchi S.**
Research Fellows : **Aditi Mukherjee**
Project Duration : **3 Years 6 Months**
Budge : **`42,61,000/-**
Funding source : **Science and Engineering Research Board (DST)**
Current Status : **Ongoing**

Social Organization, Behaviour and Phylogeography of Macaca Fascicularis Umbrosus on The Nicobar Islands, India

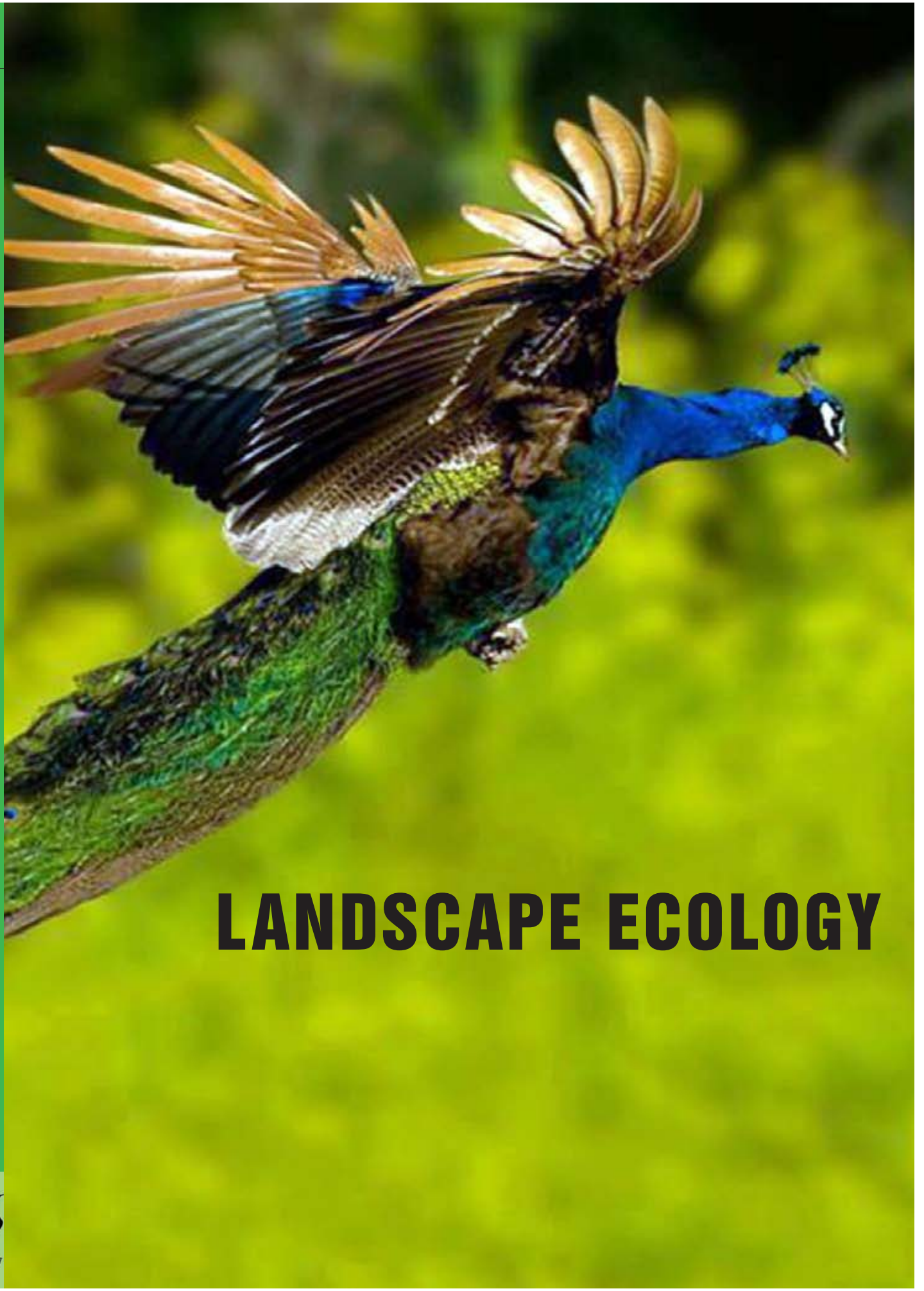


Natural disasters pose a threat to isolated populations of species with restricted distributions, especially those inhabiting islands. The Nicobar long-tailed macaque is one such species found on the three islands (viz. Great Nicobar, Little Nicobar and Katchal) of the Andaman and Nicobar archipelago. These islands were hit by a massive tsunami on 26th December 2004. The distribution and population status of M. f. umbrosus on these islands was carried out and compared the results with previous studies.The study was initiated with three objectives that include a) to assess the current status of populations of the long tailed macaque Macaca fascicularis umbrosus on the Nicobar Islands, b) to study the social organization and time-activity budget of long-tailed macaques in the Nicobar Islands in the post-Tsunami scenario and correlate this to objective, and c) to study the phylogeography of the long-tailed macaques on the Nicobar Islands. We have completed the field work and report writing is in progress.

To achieve the objectives, all the three Islands were surveyed using existing trails between January 2013 and April 2014, fecal samples were non-invasively collected for molecular work, and scan and focal animal sampling were followed for data collection on activity budgets for the individuals of the focal study group. The encounter rate of M. f. umbrosus groups per kilometre in Great Nicobar (effort 119.55km), Little Nicobar (effort 14.09 km) and Katchal (effort 78.50 km) was 0.30, 0.35 and 0.48 respectively with the mean group size of 39.83 ± 17.47 SD in Great Nicobar and 43.50 ± 26.15 SD in Katchal. Encounter rate of this study was compared with previous studies using GLM and it was found to be significantly higher (Walds Z = 3.11, P = 0.002), indicating increase in population after sharp decline reported during 2006 study. Post tsunami, there was a significant change in the proportion of adult males, adult females and immatures, but mean group size did not differ as compared to pre-tsunami times. Results showed that the population has recovered from decline caused by tsunami, but it cannot be ascertained whether it has reached stability because of the altered group structure. The study brings to light the effect of natural disasters on island occurring species.

Dr. H.N. Kumara, honnavallik@gmail.com

Principal Investigator : **Dr. H. N. Kumara**
Co-PIs : **Dr. Shomita Mukherjee**
Prof. Mewa Singh
Research Fellows : **Mr. S. Vinoth,**
Mr. Partha Sarathi Misra
Mr. Avadhoot D. Velankar
Collaborating Agencies: **CES Laboratory of Dr. Praveen Karanth**
Project Duration : **3 Years 6 Months**
Budget : ` 38,54,000.00
Funding source : **Science and Engineering Research Board (DST)**
Current Status : **Completed**



LANDSCAPE ECOLOGY

Annual Report 2015-16

SACON

Assessment of Conflicts Between Peafowl and Farmers in Coimbatore, Tamil Nadu

Human-wildlife conflicts have been on the rise in Tamil Nadu State particularly in the districts such as Coimbatore, Nilgiris and Dindigul. Elephants, Deer, Wild pig and birds such as peafowl are reported to cause damage to crops. Hence, it was decided to assess human-peafowl conflicts and to find out solutions for damages caused by peafowl in farming areas of Coimbatore. The study was carried out in the cultivation areas adjoining the Reserved Forests of Coimbatore Division. Field surveys were carried out between July 2015 and September 2015 in the adjoining villages of six forest ranges of Coimbatore Division viz. Sirumugai, Coimbatore, Periyanaickanpalayam, Boluvampatty, Karamadai and Sulur. A total of 50 locations in 35 villages have been surveyed. Questionnaire survey method was used to gather data from farmers.

A total 42 crops were found to be grown in Coimbatore. Tomato, plantain, onion, green-gram, chilli are the extensively grown crops. Peafowl were recorded in all the 50 sites visited during the surveys. In all, 18 crops were consumed by peafowl. The survey indicated that tomato constituted the most commonly cultivated crop (cultivated in 47 out of 50 fields) followed by plantain (28 out of 50) and coconut (26 out of 50) in Coimbatore. Tomato, onion, green-gram, maize and sorghum were highly damaged by the peafowl. Peafowl problem occurred throughout the year. Farmers who cultivated tomato, capsicum, onion, butter bean, maize, black-gram and sorghum suffered heavy financial loss when compared to those who cultivated red cow peas, plantain, ladies finger, bottle-gourd, bitter-gourd and finger millet. Farmers growing plantain did not report conflicts with the peafowl. Ten different bird scaring devices were employed by the farmers of Coimbatore to protect the crops from peafowl damage. Among the various scaring devices used, bursting crackers

(54%) followed by erecting scare-crow in the field (22%) were commonly used. From the discussion with farmers it was known that among the bird chasing devices used, reflective tapes, nets around crop field and drum beating were found to be effective.

A meeting of the farmers needs to be convened by the Forest Department to explain them about the mitigatory measures to reduce peafowl menace. Peafowl prefer certain crops over others. Hence, in the cultivation areas around Reserved Forests, farmers may be advised to grow crops that are less prone to peafowl damage so that conflicts could be minimized.

Dr. P. Balasubramanian, balumayura@gmail.com

Principal Investigator : **Dr. P. Balasubramanian**
Research Fellows : **Mr. C. Anbarasu**
Project Duration : **6 Months**
Budget : **`1,00,000/-**
Funding source : **Tamil Nadu Forest Department, Coimbatore**
Current Status : **Completed**

Study on Ecosystem Requirements of The Hornbills (Great Pied, Malabar Pied, Indian Grey and Malabar Grey) in Munnar Landscape Project Area, Kerala

Hornbill is an indicator species of undisturbed forest patches and top priority in terms of conservation on account of their narrow geographical range, specialized habitat preferences and low

levels of local populations. The large scale conversion and change in cultivation practices in Munnar Landscape in the recent decade made considerable changes in the habitat that impaired the survival of wildlife. Hence, the present study was undertaken to find out the habitat requirements of ornbills in the Munnar Landscape Area. The project personnel were engaged and reconnaissance surveys were carried out. However intensive study could not be continued as the field work was stalled due to non-cooperation from the local community of Munnar.

Hornbill census was done in the potential bird habitats. The habitats surveyed included evergreen forest, semi-evergreen forest, moist deciduous forest, dry deciduous forest, mixed forest, low-land riparian forest and plantations. During the surveys, geo-coordinates of hornbill sighting locations were recorded by using a GPS. Based on the geo-coordinates, distribution maps for all the four hornbill species were prepared. Also, information on hornbill distribution and occurrence were obtained from published literature. Surveys covered six major areas namely Idukki Wildlife Sanctuary, Thattekad Wildlife and Bird Sanctuary, Cardamom Hill Reserve, Idamalayar Range, Chinnar Wildlife Sanctuary and Anaimudi Shola National Park. Surveys revealed the occurrence of four species of hornbills (Malabar Grey Hornbill Ocyceros griseus, Malabar Pied Hornbill Anthracoceros coronatus, Great Pied Hornbill Buceros bicornis, and the Indian Grey Hornbill Ocyceros birostris) in the Munnar Landscape. A total of 28 nest tree species belonging to 19 families, and about 100 known food plant species of hornbills were recorded from Munnar. Major plant families that contribute to hornbill's diet included Moraceae, Lauraceae, Meliaceae, Oleaceae

and Myrtaceae.

Large trees such as Terminalia arjuna, Mangifera indica and Syzygium cumini found in the lowland riparian forests are important for the nesting of Malabar Pied and Great hornbills. Expansion of agricultural activities alongside the river leads to fragmentation of riparian forests. Hence, it is suggested to link the fragmented forests, of the river banks by planting native tree species. Plantations (Tea & Coffee), though cannot substitute the original forests do support the hornbills, as several shade trees i.e Ficus spp, Syzygium cumini, Lagerstroemia microcarpa, Terminalia spp and Mangifera indica attract hornbills by providing fruits or form ideal nesting sites. Hence, major food and nest trees of hornbills occurring in plantations need to be protected with the co-operation of planters.

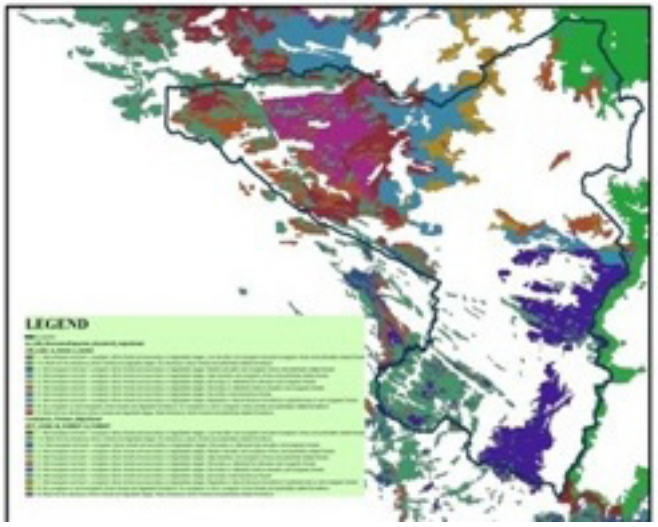
Dr. P. Balasubramanian, balumayura@gmail.com

Principal Investigator : **Dr. P. Balasubramanian**
Co-PIs : **Dr. P.V. Karunakaran**
Research Fellows : **Mr. L. Prakash,**
Mr. Mohamed Ibrahim
Project Duration : **1 Year**
Budget : **`3,30,000/-**
Funding source : **UNDP, New Delhi**
Current Status : **Discontinued**

Developing Site-Specific Eco-Restoration Protocol Based on Existing Community Requirements in Munnar Landscape Project Area, Kerala

A major conservation issue, particularly in the tropics is habitat loss and fragmentation due to various developmental activities. Munnar landscape has an intricate development and resource dependent history that leads into the degradation and fragmentation of pristine habitats. Hence ecorestoration has been identified as one of the major projects under the India High Range Landscape Project (Munnar Landscape Project) with the following objectives., (i) Identify, document and prioritize sites/habitats in the landscape for eco-restoration activities, (ii) Conduct review and document the eco-restoration practices presently adopted by Kerala Forest Department, (iii) Review the existing acts and policies related in the light of conflicting interest between development and local community, (iv) Develop monitoring protocol with baseline information, and (v) Develop a protocol containing innovative and cost-effective ecorestoration practices for each identified site/habitat in the landscape based on the existing community requirement in the light of existing acts and policies.

The project activities were initiated through collection of secondary information, both spatial and non-spatial, from various sources. Since the project was terminated due to some logistic issues in the field, only part of the objectives was accomplished. It was found that about 1520 km2of forest area (evergreen, semi evergreen and moist deciduous) was found either partially or completely degraded (Figure 1) which falls in the Malayattoor, Mankulam, Munnar, Marayoor, and Kottayam territorial divisions and Idukki and Munnar wildlife divisions.



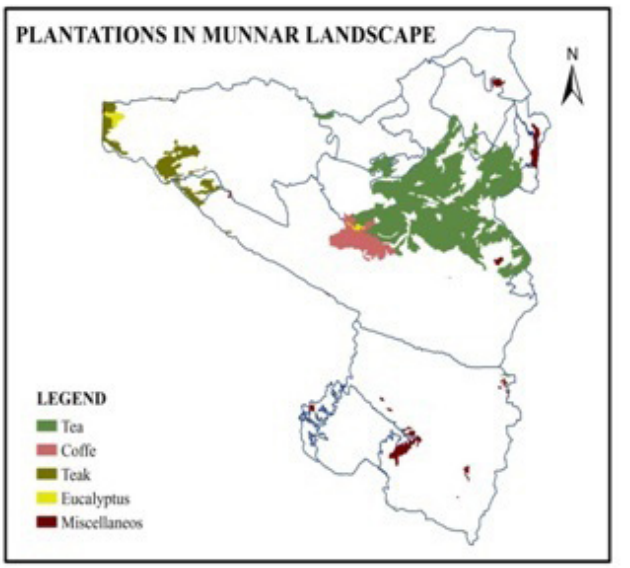
Since majority of the project landscape falls in the windward side of the Ghats, evergreen forests of the low and medium elevation are the major forest types (more than 90%) that are degraded. There are 13 tribal communities in 130 settlements and numerous non-tribal settlements in this landscape who are engaged in collection of forest products such as firewood, honey, cinnamom bark, turmeric, medicinal plants, spices, condiments and masticators, gums and resins, dyes, tanning materials, essential oils, detergents, cosmetics and perfumes, narcotics and beverages, fibers and flosses, edible and fodder plants and gooseberry, for their sustenance. In order to suggest suitable plant species for the restoration in different landscape elements interactions were held with the communities and they suggested nearly 107 plant species which are useful for them.

Dr. P. V. Karunakaran, karunakaranpv@gmail.com

Principal Investigator : **Dr. P. V. Karunakaran**
Co-PI : **Dr. Mathew K. Sebastian**
Research Fellows : **Mr. Anoop N. R.**
Mr. S. Nagendran
Project Duration : **1 Year**
Budget : **`17,73,000/-**
Funding source : **UNDP**
Current Status : **Discontinued**

Land Use and Management Plans for Production Landscapes in Munnar Landscape Area, Kerala

The High Range Landscape of Kerala was subjected to extensive commercial and forestry plantations by cutting down the natural forests. The impact of such conversion on conservation was incredibly huge and large spectrum of both plants and animals are affected due to this. Hence to address this issue, it was envisaged to mainstream the production activities with conservation of biodiversity, a project entitled as landuse and management plans for production landscape was identified with the following objectives: (i) identification and mapping of different commercial and forestry production landuses, (ii) characterizing the production landscapes, (iii) assessing the ecological and conservational



Principal Investigator: **Dr. P. V. Karunakaran**
Co-PI : **Dr. Mathew K. Sebastian**
Research Fellows : **Mr. E.Kanthaiya Aadhavan**
Ms. V. Gayathri
Ms. G. Uma
Project Duration : **1 year**
Budget : **`19,71,000/**
Funding source : **UNDP**
Current Status : **Discontinued**

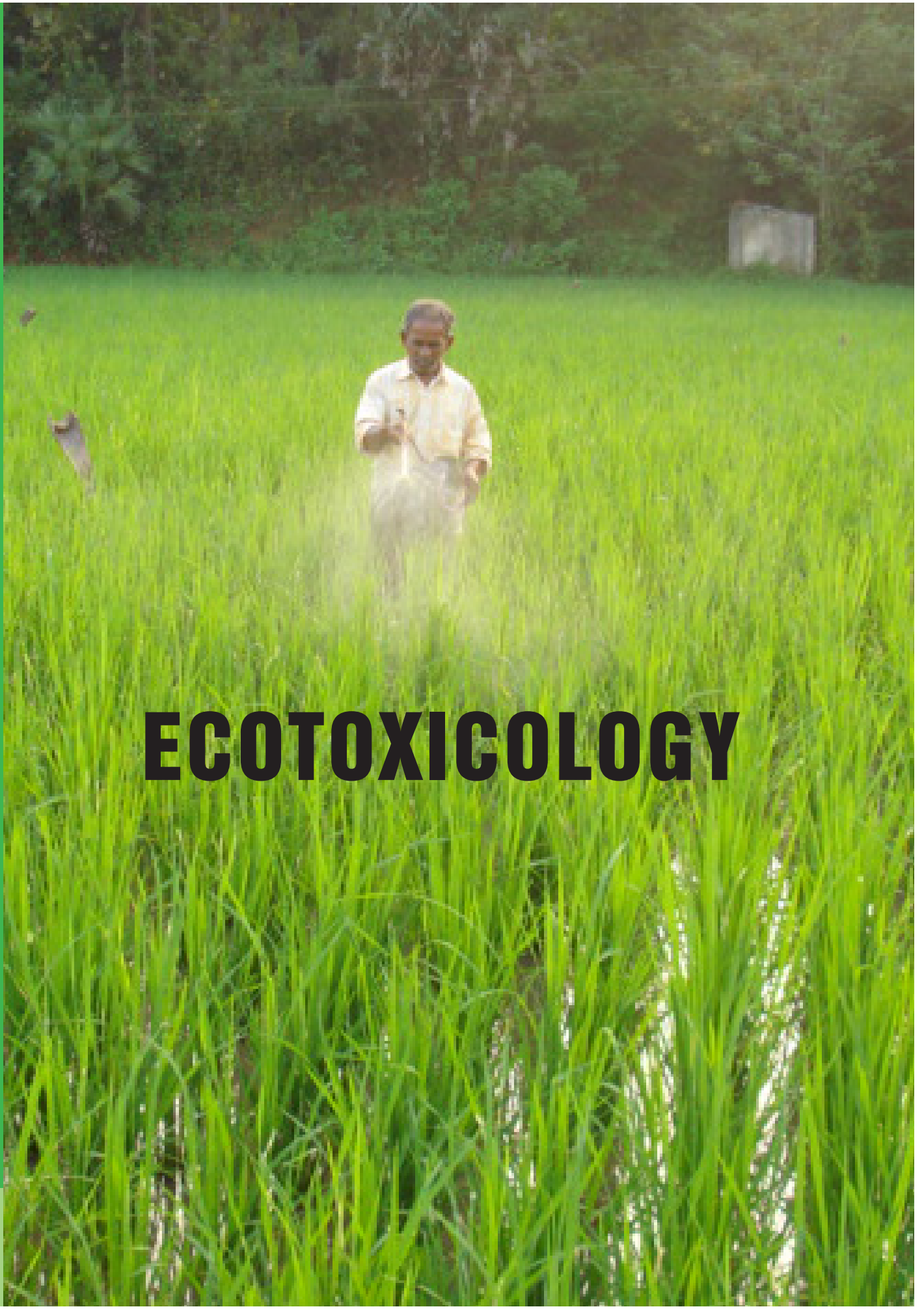
importance of production landscapes, (iv) identification of management threats/issues that impede biodiversity conservation and environmental health in the production landscape, (v) conduct review of the management inputs into different production landscapes, (vi) develop a tool kit (spatial data base) on production landscapes of the project area and (vii) develop

landuse management plan with specific strategies for mainstreaming biodiversity conservation for different production landscapes.

The three major sectors of production landscapes in the Munnar landscape are agriculture, forestry and commercial plantations apart from the home gardens. Among these, forestry and commercial plantations dominate the area and agriculture practices are found only in the eastern Anjanad valley. Plantations of teak, Eucalyptus, wattle and other miscellaneous species occupied about 315.80 km2 in the landscape especially in Malayattoor, Munnar and Kottayam Forest divisions.

Commercial plantations such as tea and cardamom predominates the cash crops with approximately 140.00 km2. These plantations in the landscape has retained several interspersed forest fragments (varying in extent from 0.1 ha to 1,000 ha), currently are valuable as they act as corridors and store-houses of biodiversity. Agriculture practices in the eastern Anjanad valley is the third major production activities where in cultivation of vegetables, fruits, sugar cane and rice paddies are practiced. The colder and higher areas of the landscape lying towards the east have vegetable farming (1,600 ha) and intensive Eucalyptus grandis plantations. A few farmers cultivate fruits such as apple, peach while many farmers maintain small home gardens of multi-purpose tree species. The major impacts of these land uses are habitat loss, fragmentation, invasive species introduction, habitat depletion, environmental pollution, crop and property damage, threat to human life, loss of biological corridors, transfer of diseases, and displacement of species from one place to another.

Dr. P. V. Karunakaran,
karunakaranpv@gmail.com



ECOTOXICOLOGY

Annual Report 2015-16

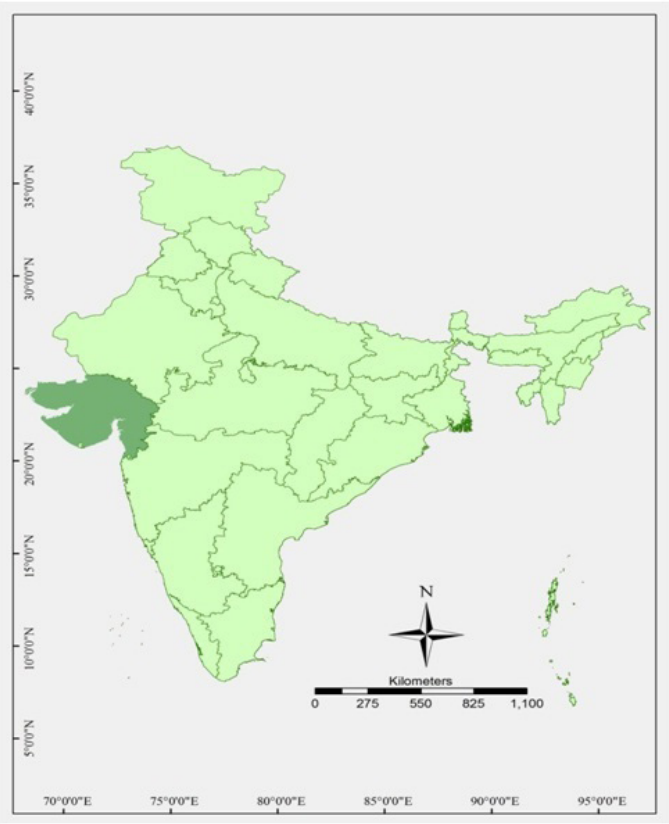
SACON

Monitoring and Surveillance of Environmental Contaminants in Birds in India

The samples of dead birds from all over India were collected following opportunistic sampling strategy and organized field visits. Post-mortem examinations were conducted either in the field or at SACON laboratory and suitable tissues preserved at -200C. During the period under report, levels of Polycyclic Aromatic Hydrocarbons (PAHs) and heavy metals were quantified in six and nine species of birds respectively. QuEChERS multi-residue extraction method was followed for extracting PAHs residues from tissue samples. Final quantitative analysis was carried out in HPLC equipped with Fluorescence Detector. For metal analysis, Microwave Digestion System was used for digestion of samples, and Atomic Absorption Spectrophotometer (AAS) for estimation.

Heavy metals: Feathers of nine species of birds, namely Indian Peafowl Pavo cristatus, Painted Strok Mycteria leucocephala, House Crow Corvus splendens, Little Egret Egretta garzetta, Collared-dove Streptopelia decaocto, Spotted Dove Streptopelia chinensis, Great White Egret Ardea alba, Comb Duck Sarkidiornis melanotos and Common Myna Acridotheres tristis collected from Ahmadabad, Gujarat were analysed for heavy metals, namely zinc (Zn), manganese (Mn), copper (Cu) and iron (Fe). Among the four metals studied, levels of iron were the highest (secondary feather - 289.91 ppb) and copper the lowest (Primary - 4.62 ppm).

Accumulation of metals also differed among feeding guilds



of birds. It was observed that omnivorous birds had the highest level of total metals (418.12 ppm) followed by carnivorous (404.11 ppm), and granivorous the lowest (Mn - 389.49 ppm). Common Myna had the highest level of total metal burden (591.86 ppm), followed by Great White Egret (554.08 ppm). Indian Peafowl had the least burden of heavy metals. Quality of habitats, feeding habits and metabolic activities are the major factors that influence accumulation of metals in different species.

Polycyclic Aromatic Hydrocarbon: In total, 33 individuals comprising six species of birds, namely Blue Rock Pigeon Columba livia, Black Kite Milvus migrans, Born Owl Tyto alba, Rose-ringed Parakeet Psittacula krameri, Glossy Ibis Plegadis falcinellus and Indian Peafowl Pavo cristatus collected from Ahmadabad, Gujarat during 2014 January were analysed for USEPA - listed 16 PAHs. Levels of total PAHs varied among the six species of birds studied. Blue Rock Pigeon had the maximum level (125.64 ppb) of total PAHs and Indian Peafowl the minimum (33.79 ppb: Kidney). Incidentally Indian Peafowl is the only species that accumulated all the 16 PAHs. Among all the 16 PAHs, acenaphthylene (23.65%) contributed maximum to the total PAH concentration. Petrochemical industries located in and around Ahmadabad were the major source of contaminations and information elsewhere in the country for comparison are lacking. Further sample and data analyses are under process.

Dr. S. Muralidharan, ecot_mur@yahoo.com

Principal Investigator : **Dr. S. Muralidharan**
Research Fellows : **Mr. K. Ganesan,**
Mr. K. Nambirajan,
Ms. V. Kirubhanandhini
Project Duration : **3 Years**
Budget : **`48, 36, 000/-**
Funding source : **MoEF, Govt. of India**
Current Status : **Completed**

ENVIRONMENTAL IMPACT ASSESSMENT

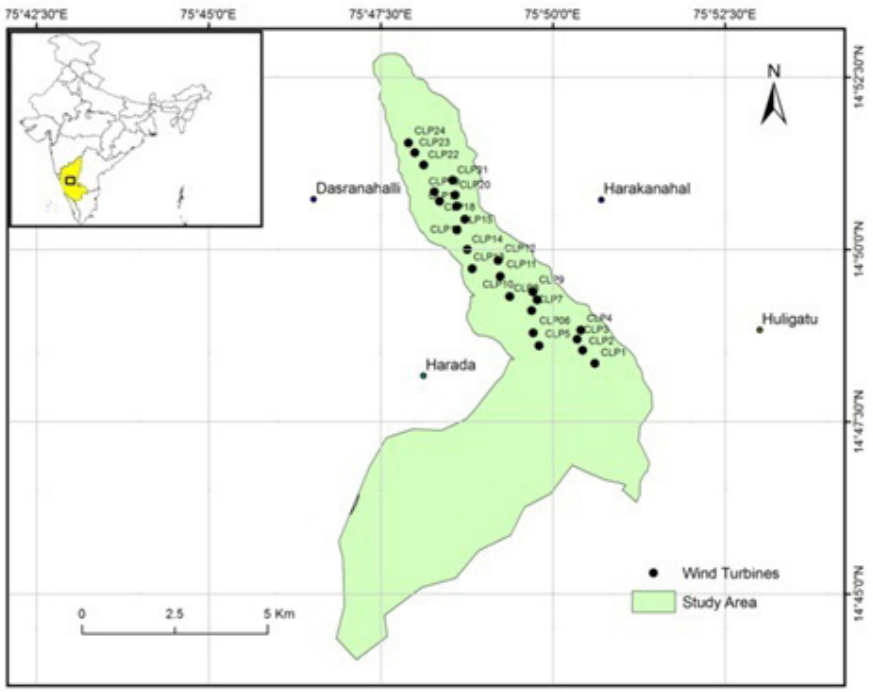
Annual Report 2015-16

SACON

Impact of Hara Wind Power Project of Clp Wind Farms (India) Ltd. On Wildlife Including Migratory Birds and Raptors At Harapanahalli, Davangere, Karnataka

The study assessed the risk posed by wind turbines on the wildlife especially on the avifauna at Davengare, Karnataka. The project was completed during the reporting period.

The study evaluated the impact of wind turbines on the fauna especially birds and bats and quantified the direct mortality risk to birds and bats from collision. The methodology followed for the study was aimed at addressing two major aspects : 1) to document the faunal abundance and its seasonal and spatial patterns and 2) to assess the potential impacts (both direct and indirect) on the avifauna. The line transect and total count (for wetlands) methods were used for documenting the bird abundance, while the intensive searches for bird carcasses at turbine sites and flight height monitoring of birds were used for addressing the second objective.



The results of the study indicated that wind turbines do cause bird mortalities at the Hara wind farm area. The estimated annual mortality rate of birds was 0.47 individuals/ turbine and that of bats was 12 individuals/ turbine respectively. The bat mortalities recorded were comparatively higher than that of birds in the Hara wind farm which is contrary to the report from another Indian Wind farm at Katchch area wherein higher bird mortalities were recorded.

Though the estimated mortality rates of raptors, other birds and bats were not alarmingly high in the Hara wind farm it was found that the bats are at a higher risk compared to birds at this site. Higher rate of mortality for bats posed by Hara wind farm needs closer monitoring and management on a long-term basis. The measures we proposed include; 1). Minimize the lighting around the turbines during night to minimize the congregation of insects at turbine sites and thus indirectly attracting nocturnal insectivorous birds and bat species. 2). Forest department may be urged to intensify the fire control measures in the forests adjoining the Hara wind farm in order to minimize the influx of various faunal species to the relatively unburnt habitat areas available in the Wind farm which might result in escalated risk of collision for the aerial faunal elements such as bats and birds.

Dr. P. R. Arun, eiasacon@gmail.com

Principal Investigator : **Dr. P. R. Arun**
Co-PI : **Dr. Rajah Jayapal**
Research Fellows : **Mr. V. Anoop**
Project Duration : **14 Months**
Budget : **`16,46,000/-**
Funding source : **CLP Wind Farms (India) Pvt. Ltd**
Current Status : **Completed**

Preparation of Management Plan of Fudam Bird Sanctuary, Diu

The Fudam Bird Sanctuary(FBS) having an area of 2.18 Sq.km. is situated in the Diu Island of the U.T. of Daman & Diu with a habitat that is rich in birds. It is interspersed with numerous creeks and mud flats. The final notification under Section 26 A (I) of the Wildlife Protection Act, 1972 in respect of this Sanctuary was issued on 08/12/2006 by the Administration of Daman & Diu. Though certain habitat management activities have been carried out periodically in the Sanctuary, there is no approved management plan for the Sanctuary in place. Hence the Forest Department of Daman & Diu approached SACON to develop a management plan to facilitate the long term planning for the habitat management of the Sanctuary.

The major objectives of this management plan are : 1) To evaluate various issues related to opportunities and threats in the FBS for its ecological development and sustenance, 2) Development of a management action plan 3) Survey and assessment of floral and faunal diversity of the Sanctuary and preparation of zonal action plan and theme plan for the management of the FBS along with maps. Standard field methods for avifauna and wildlife and socioeconomic questionnaire surveys were used to collect the primary data, in addition to the secondary sources of information.

Present study adopted standard methods to document flora and fauna of the area. Survey was carried out in Fudam Bird Sanctuary as well as in adjoining areas of the bird Sanctuary. Survey was conducted covering different available habitats such as Grasslands, Fresh water pools, Coastal areas, Human habitation, Forest area in Dagacha, Simbur Coast, and Fresh water wetlands in Gujarat side (Naliya Mandvi). The efforts were distributed representatively in all the areas and each site was visited three times for repeated counts. Field work has been completed, and draft report has been submitted. Detailed plans for Monitoring and Conservation of FBS and delineation of ecological buffer zone areas, infrastructure for ecotourism are proposed. The final report will be submitted in consultation with the Forest Department.

Dr. P. R. Arun, eiasacon@gmail.com

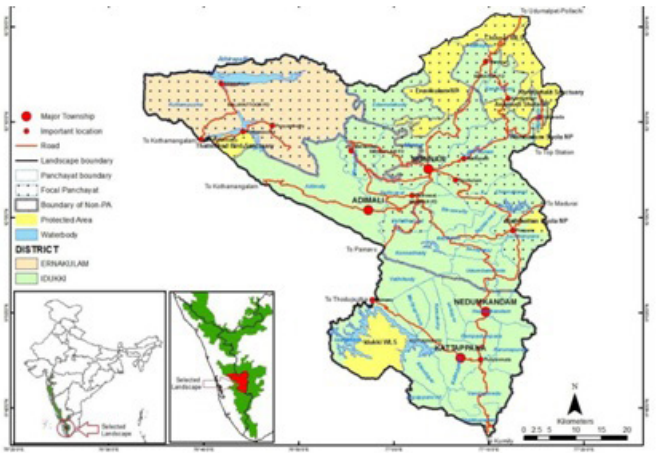
Principal Investigator : **Dr. P. R. Arun**
Co-PIs : **Dr. Rajah Jayapal**
Research Fellows : **Mr. P. Rajan**
Project Duration : **6 Months**
Budget : **`7,00,000/-**
Funding source : **Forest Dept.,Daman & Diu**
Current Status : **Ongoing**

Plant-Animal Community Studies in Various Landscape Elements (Birds and Butterflies) in The Munnar High Range Mountain Landscape Area, Kerala

The project on Plant- Animal Community in the Munnar High range Mountain Landscape Area, a collaborative project between SACON and JNTBGRI, Thiruvananthapuram was one of the several component projects envisaged under the UNDP's High Range Mountain Landscape program. The study was to bring out a broad idea on the spatial patterns in the species assemblages and identify priority areas of conservation significance and viable management options taking lessons from the past experiences.The project was aimed at studying the plant, bird and butterfly assemblages of various habitat/landscape elements within the HRML region and to evaluate the conservation importance of these communities including endemicity, rarity, endangeredness and habitat specialization viz. 1) Documentation of plant, bird and butterfly communities in different landscape elements of HRML 2) Patterns of Assemblage and distribution of species across habits and gradients 3) Delineation/ Prioritization of conservation important areas with respect to targeted taxa 4) An objective analysis of the management issues that affect the community composition of plants, birds and butterflies and 5) Landscape element and community specific conservation strategies to facilitate long-term sustainability of the wildlife species and associated ecosystem services in the HRML landscape.

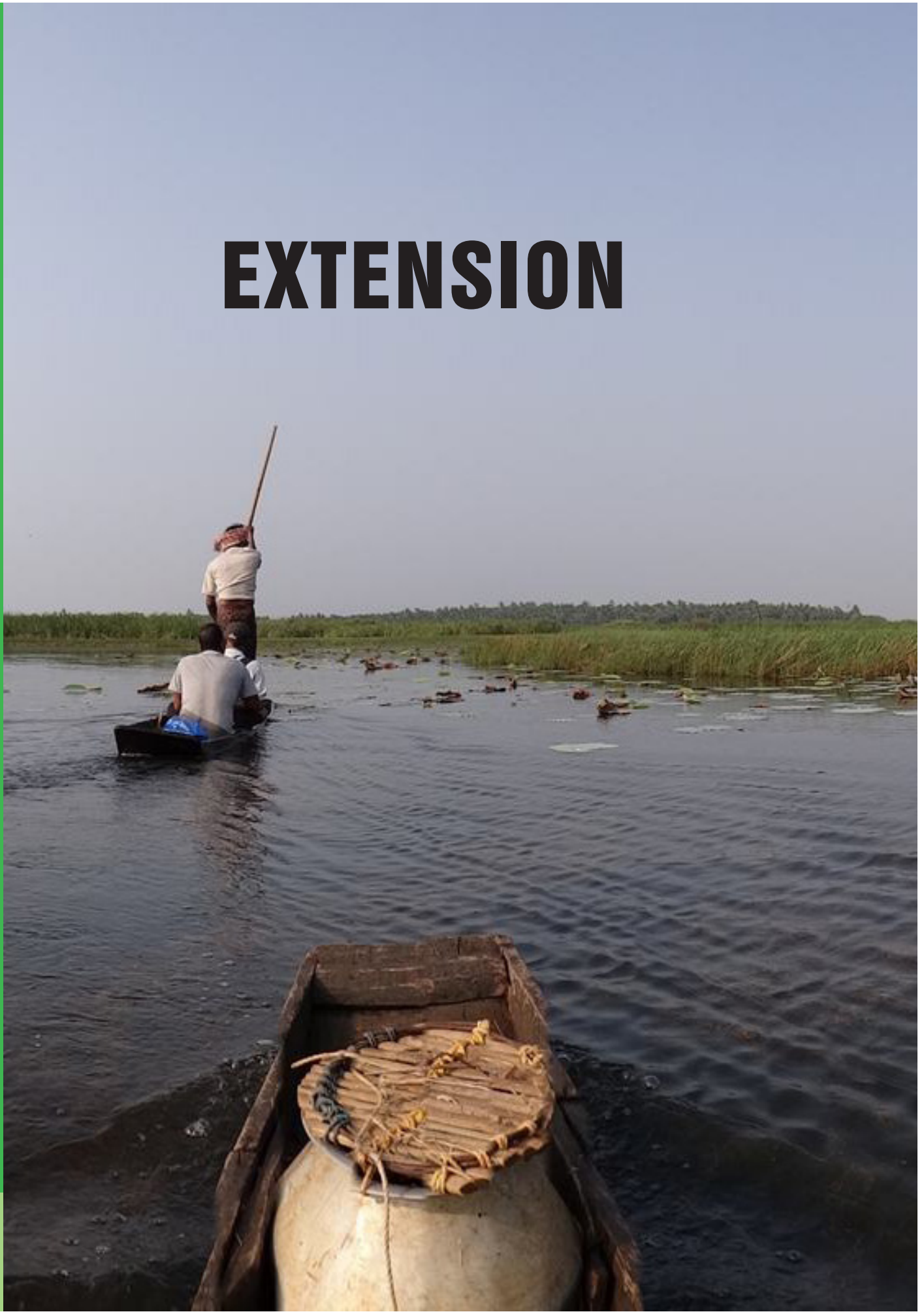
Detailed field surveys were planned on identified landscape elements and taxa using standard methods adopting a stratified random sampling approach across important types of landscape elements where data gap is identified covering spatial and seasonal dimensions. The sampling strategy was finalized after the initial reconnaissance, and finalizing the study area based on the maps. It was expected that the detailed HRML area map depicting the whole study area to be covered would be made available for the use of all the projects for uniformity and better metadata compilation and meaningful geo-spatial interpretation of outputs from multiple projects. Since the HRML program could not be continued by UNDP because of the local people's opposition in Kerala, the project was suspended midway as requested by UNDP before any systematic field data could be collected. Hence the project could not fully achieve its objectives.The secondary information collected on the fauna and flora of the HRML landscape was compiled in the form of three booklets and the project was suspended.

Dr. P. R. Arun, eiasacon@gmail.com



Principal Investigator: **Dr. P. R. Arun**
Co-PIs : **Dr. P. V. Karunakaran**
Dr. P. Balakrishnan
Research Fellows : **Mr. S. Ramesh Kumar**
Mr. N. Anoop Raj
Mr. N. Ramarajan
Project Duration : **1 Year**
Budget : **`24,90,561/-**
Funding source : **UNDP**
Current Status : **Discontinued**

EXTENSION



Annual Report 2015-16

SACON

Documenting The Biodiversity of Sompeta Wetland, Srikakulam District, Andhra Pradesh and Developing Biodiversity-Mediated Livelihood Options for Local Communities.

From the preliminary assessment enhancement of livelihood options it was found that the villagers who are the immediate stakeholders of the wetland complex possess high natural and social capital whereas the financial capital of the people is uneven. The Beela and the biodiversity of the Beela are the main natural capital of the surrounding population. Another notable feature of the villages is the existence of active Self Help Groups (SHG's) run by women.

There is scope for establishing a cooperative diary benefitting the farmers rearing milch cows. Other livelihood options available are, development of ecotourism in the Beelas, harvesting and processing of Lotus tubers as a delicacy and preparation of mats from Pandanus leaves.

Dr. Mathew K Sebastian,
mathewksebastian1@gmail.com

The Sompeta wetland complex spreads over nearly 1600 ha in Srikakulam District of Andhra Pradesh State. An earlier study by SACON highlighted the biological importance and social relevance of this wetland. The present survey was taken up to document the biodiversity of selected taxa such as avifauna, butterflies and piscifauna and explore and suggest recommendations to enhance sustainable livelihood options for local stakeholders. The wetland and the surrounding coastal landscape was divided into subunits based on their unique habitat features. Birds were sampled from these habitats using standard methodologies like Point-count method for woodland birds and vantage-point based total count method for water birds. The same methods, as birds, were followed for documenting the Lepidopteran fauna. A detailed survey of the locally available resources and existing livelihood practices and options for the local people is being assessed by collecting information through participatory tools, questionnaires and focused and semi structured interviews.

In total, 125 species of birds were recorded which included 48 species of water birds and 16 species of wetland-dependent birds. Five species of Near Threatened birds (IUCN 2015) were recorded which include Black-headed Ibis, Oriental Darter, Eurasian Curlew, Curlew Sandpiper, and Alexandrine Parakeet. The survey also revealed the occurrence of uncommon species like Long-toed Stint, Whimbrel, Pacific Golden Plover, and Black-breasted Weaver. Available data on the avifauna diversity indicate that Sompeta wetland complex meets the criteria necessary to be declared as an Important Bird Area. Thirty three species of butterflies, 23 species of Odonata including 17 dragonflies and 8 damselflies belonging to 4 families were also recorded. Regarding fish diversity, only few species of cat fishes and Puntius spp. were recorded.

Principal Investigator : **Dr. Mathew K. Sebastian**
Co-PIs : **Dr. P. R. Arun**
Dr. Rajah Jayapal
Dr. P. A. Azeez
Research Fellows : **Mr. Ramesh Kumar**
Project Duration : **8 Months**
Budget : **`1,09,500/-**
Funding source : **Paryavaran Parirakshna Samiti, Sompeta**
Current Status : **Ongoing**

WETLAND ECOLOGY

Annual Report 2015-16

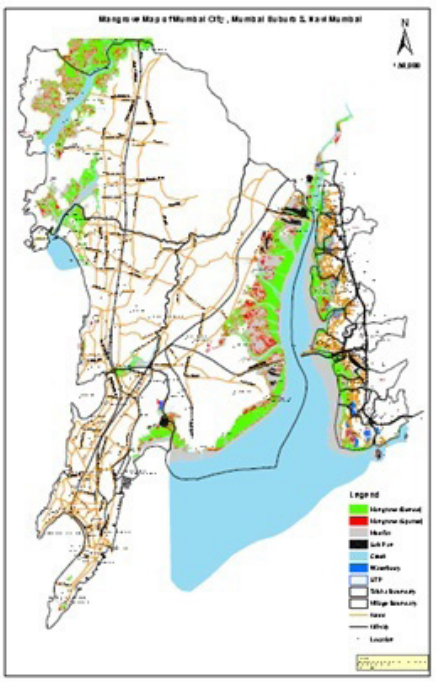
SACON

Conducting Baseline Studies for Thane Creek, Maharashtra

Thane Creek originating at its northern extremity from the Ulhas River extends over a distance of 26 km opening at the Southwest in Mumbai's Harbor. The Thane creek and the mangroves surrounding it are located in Mumbai. With its designation as Flamingo Sanctuary during July 2015, this study during November 2015 to April 2016 having three objectives emphasizes the importance of conserving the creek.

To achieve the first objective i.e. Derive a baseline understanding of Thane creek through previous studies conducted and existing literature for Thane Creek, we scanned over 3000 available literature. We found that the modern literature for Thane creek spans 160 years i.e. 1857 to 2016. The earliest literature of 1857 on Thane creek talks about its geology. The diversity, extent and biology of mangroves from Thane creek have been studied since the early 1900's. Environmental parameters, productivity and heavy metal contamination for the creek were addressed only since 1960's. The solid waste and nonbiodegradable pollution has been the matter of concern only since the 2000's and so is the focus on avifauna. The major livelihood component i.e. the fishery has received very little attention with most of the studies on fish being done only during the 1980's and 90's.

The second objective of undertaking biodiversity studies for Thane creek has revealed a large number of species occupying different niches. Thane creek shows the presence of 11 true mangrove species representing eight genera and six families. Species belonging to the Avicennia genus are the most dominant mangrove. The mangrove associate species comprised of 27 species belonging to 17 families. The phytoplankton documented from Thane creek during the present study comprises of 35 species; with dominance of Thalassiosira sp. Zooplankton comprises of 24 species with the dominance of Medusae and Acetes species. Among the benthic fauna the mollusc Certithidopsilla djadjaviaencsis was most dominant followed by the Nerita species. The polychaetes were comparatively in low numbers and restricted in distribution to the lower stretches. The edible bivalve was also restricted to the lower stretches of the creek. In sum, the benthos comprises 30 different species representing 20 different families. We also recorded 11 species of edible fin fish and three species of crustaceans. Insects are the most abundant and important group, during our study we recorded 67 insects belonging to 30 different families and eight orders with dominance of Lepidoptera. The avifauna documented during the study comprises of 155 species of birds representing 52 families was recorded with 76 wetland and shore birds.



While analysing the stakeholders of the creek the third objective, we observed that the fishing community is the major stakeholder. They were the custodians and caretakers of the creek, however with the decline in the health of the ecosystem they are facing major livelihood concerns. The decline in fish has resulted in fishers travelling long distances to catch fish leading to the reduction in the number of locals opting for fishing as an occupation.

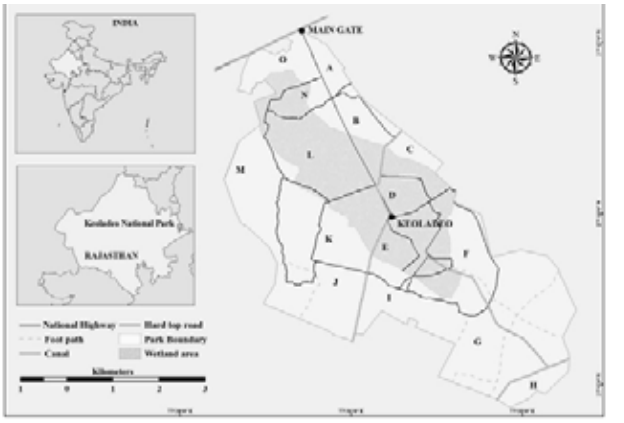
Dr. Goldin Quadros, goldinq@gmail.com

Principal Investigator : **Dr. Goldin Quadros**
Co-PIs : **Dr. P. A. Azeez**
Dr. M. Mahendiran
Dr. S. Shirish Manchi
Dr. R. P. Athalye
Research Fellows : **Mr. Siddhesh Bhave**
Mr. Amol M H Tripathi
Mr. Prathamesh Gujarpadhye
Ms. Sonia Benjamin
Ms. Janice Vaz.
Collaborating Agencies : **B.N.Bandodkar College of Science, Thane**
Project Duration : **6 Months**
Budget : **`14,95,000/-**
Funding source : **Mangrove Cell, Maharashtra and GIZ**
Current Status : **Ongoing**

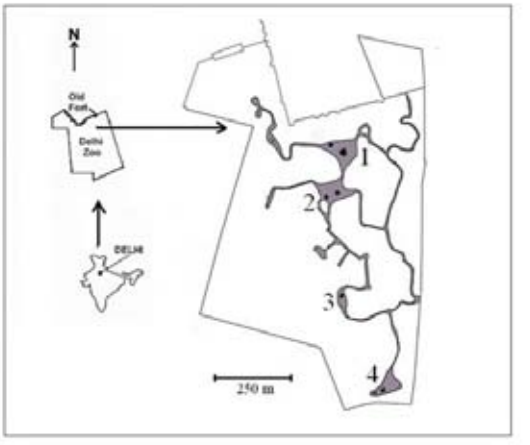
Assessment of The Morphological Diversity and The Ecological Patterns in The Near Threatened Colonial Water Birds Across Indian Sub-Continent Using Novel Approach

Morphological diversity particularly the sexual size dimorphism for long is being quantified on the basis of univariate measurements of key traits. However, this method faces several limitations. The limitations of the traditional univariate measurements could be circumvented by the application of geometric morphometrics, which examines the shape associations among an entire set of landmark points. Here, we tested the Sexual Size Dimorphism (SSD) and Sexual Shape Dimorphism (SShD) in the wild Painted Stork (Mycteria leucocephala) using a novel method and Geometric morphometrics respectively.

We developed a method for in situ estimation of SSD through digital photographs, and identified the subtle difference in the bill length between the sexes of Painted Storks. As expected, males are comparatively larger than females, and variation in the bill size and shape are prominent between males and females. Thus, we could demonstrate the utility of Geometric Morphometrics to understand the ontogenic variations and the expression of the sexual size and shape dimorphism in wild Painted Stork. Because the Painted Stork is a large bird with no sexual dimorphism, and both the sexes look alike, therefore, our results aids in differentiating the subtle morphological variation between the sexes along its size and shape. Further, it could help testing a number of hypotheses on morphological variations.



Keoladeo National Park



Dr. M. Mahendiran, mahenrose@rediffmail.com

Principal Investigator : **Dr. M. Mahendiran**
Research Fellows : **Mr. Rajneesh Dwevedi**
Project Duration : **3 Years**
Budget : **`16,45,000/-**
Funding source : **DST-SERB**
Current Status : **Completed**

Carrying Out Ecotoxicology of Fishes, Crabs and Bivalves At Thane Creek, Maharashtra

The objective of this study is to assess the impact of pollution on the biodiversity and bio resources of Thane creek due to pollution and on the communities dependent on the ecosystem for their livelihoods.

Thane Creek originates at its northern extremity from the Ulhas River; it extends over a distance of 26 km opening at the Southwest in Mumbai's Harbor. It is a triangular mass of brackish water which widens out and opens to the Arabian Sea in the South. Along both sides of the creek, many industrial units have been in operation. Thane creek is the ultimate recipient of all the liquid discharges from these industries. The discharges into the creek on its Western side are dominated by Mumbai city sewerage and effluents from the industrial complexes. The Thane creek is one of the biggest natural creeks in India but also among the most polluted one.

With its designation as Flamingo Sanctuary during July 2015, Thane Creek is an important part of Bombay's environment, a study on the metal concentrations from the ecosystem components of the creek can be useful as an indicator of pollution.

The objective of this study is to assess the impact of pollution on the biodiversity and bio resources of Thane creek due to pollution and on the communities dependent on the ecosystem for their livelihoods.

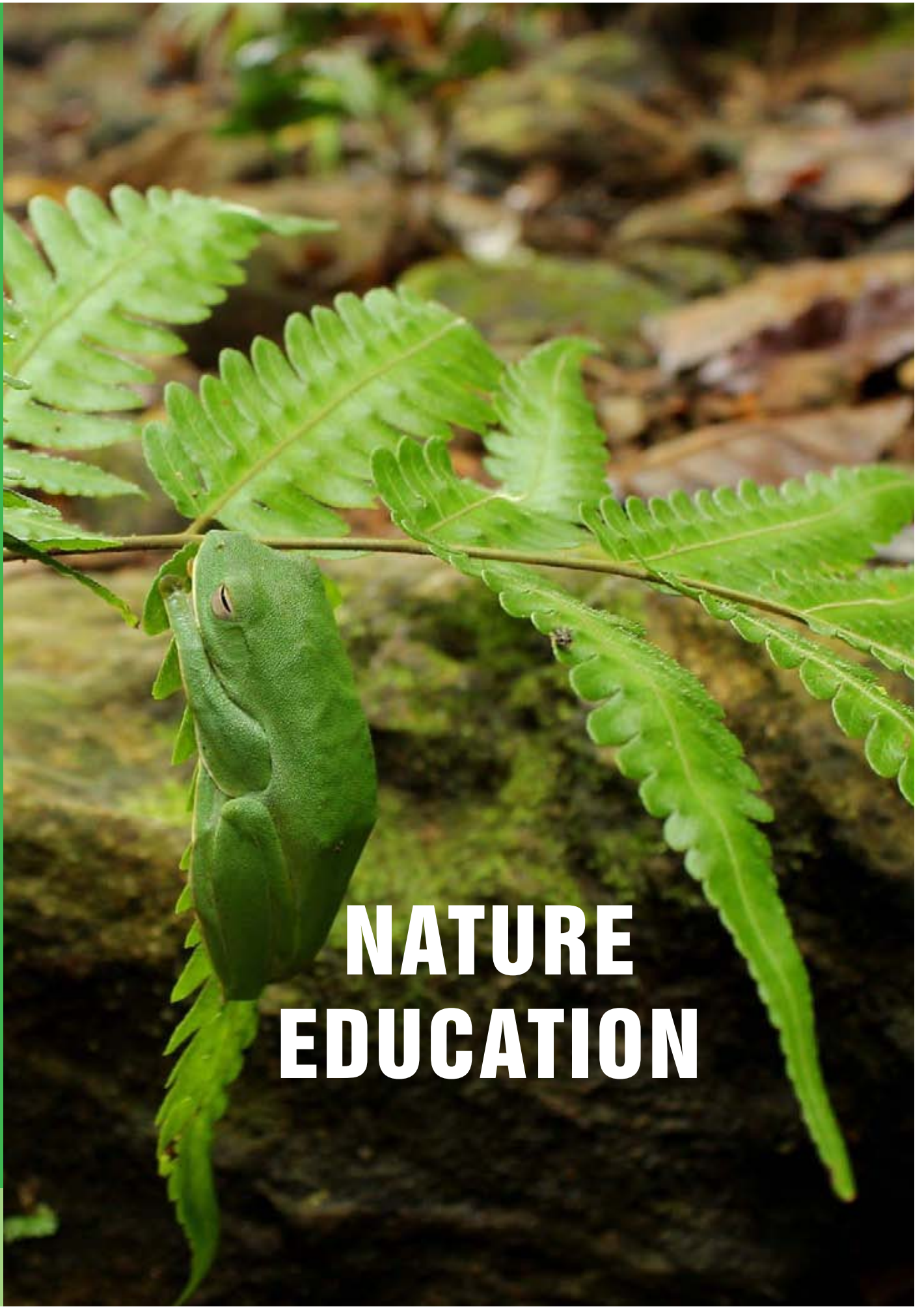
The water, sediment, bivalves, crustaceans and fish from Thane creek were sampled during the months of December 2015 and January 2016 processed and analysed for heavy metals on the ICP AES at SAIF IIT, Mumbai. The heavy metals obtained in the overall scan included B, Ba, Ca, Co, Cr, Cu, Pb, Fe, Li, Ni, Hg, Zn, As, Ti, Sr, V, Yb, Zr and Al in detectable quantities. Based on the literature survey and the past records

for the types metal accumulation in Thane creek, we decided on the estimation of ten metals namely As, Co, Cr, Cu, Fe, Ni, Hg, Cd, Pb and Zn. The values showed the following ranges for the water and the biological samples.

The preliminary analysis showed bioaccumulation in various animal communities that can be detrimental to the health of the ecosystem.

Dr. Goldin Quadros, goldinq@gmail.com

Principal Investigator : **Dr. Goldin Quadros**
Co-PIs : **Dr. P.A. Azeez**
Dr. M. Mahendiran
Dr. S. Manchi Shirish
Dr. R. P. Athalye
Research Fellows : **Mr. Siddhesh Bhave**
Mr. Amol M H Tripathi
Mr. Prathamesh Gujarpadhye
Ms. Sonia Benjamin
Ms. Janice Vaz.
Collaborating Agencies : **B.N.Bandodkar College of Science, Thane**
Project Duration : **6 Months**
Budget : **`3,94,000/-**
Funding source : **Mangrove Cell, Maharashtra and GIZ**
Current Status : **Ongoing**



NATURE EDUCATION

Annual Report 2015-16

SACON

Exploring Nature Through Birds

Exploring Nature through Birds (ENTB) is aimed at developing a module for science communication for inculcating observation and documentation skills among children. First part was to develop a module for science communication for nurturing careful observation and systematic documentation among children. The second part was to communicate those materials widely as possible. The module developed contain three books and four posters. This resource material is now facilitating a participatory nature monitoring program designed for children and also helpful for bird watchers, nature enthusiasts, environmentalists and conservationists. During this period, resource materials were distributed to teachers from 94 schools of 31 districts of Tamil Nadu, Kerala, Karnataka and Andhra Pradesh. The programme was introduced through apprising programmes for children (approx. 500 numbers) and teachers in more than 100 schools in Coimbatore District. We have also presented programme to school children (more than 3500 students) in our regular nature camps at SACON, Coimbatore. Introduced the concept and distributed modules to all members of Sálim Ali Naturalists Forum (SANF), Agriculturists' Association, Art, Culture, Heritage, Nature & Biodiversity Conservation Societies for taking them to their children's units.

Regular follow-ups to schools in Coimbatore and Pollachi were made to promote the concepts and field work for ENTB. The soft copies were made available to free download for the registered ENTB participants online. Developed a team of mentors of the ENTB programme involving bird watchers, environmentalists and other nature lovers. Distributed the module material to them to work as resource persons.

After the popularisation process, ENTB online web portal (http://www.saconeducation.org/entb) had attracted many students, bird watchers, nature lovers and conservationists. At present we have 200 registered online ENTB members, who upload their observations on common bird population.

Dr. P. Pramod, neosacon@gmail.com

Principal Investigator : **Dr. P. Pramod**
Research Fellows : **Ms. C. Divyapriya**
Project Duration : **3 Year**
Budget : **`1,80,000/-**
Funding source : **Dept. Science and Technology (NCSTC)**
Current Status : **Ongoing**

Nature Education Activities for Coimbatore, Tamil Nadu

One day Nature Awareness Programmes at SACON: Twenty three nature awareness programmes for students were conducted in the campus. In total, 1810 students along with 122 teachers articipated in these programmes. Each programme contained nature treks, field lectures, slide shows and interactive sessions with scientists. Sálim Ali Naturalist Forum (SANF) is a platform of Nature Education for all who love nature and wanted to contribute towards Conservation of Nature coordinated and facilitated by SACON. Nature lovers of Coimbatore from different walks of life like, businessmen, engineers, Computer professionals, Professors, Doctors. Students and many others visited SACON for a common cause, i.e. learn, enjoy and advocate Nature. Currently 170 active members participate in all these programmes. SANF conducted five field programme and five lectures during this period which include the bird watching and trekking programmes in forests in and around Coimbatore. Visioning India Lecture Series: This is a year long lecture series visualized for the general public of Coimbatore as a Nature Education programme in collaboration with Young Indians of CII Coimbatore Chapter. Mr. U. N. Ravikumar Former Director, Centre for Appropriate Rural Technology, Mysore gave the first lecture in this series on15th October 2015. He spoke on the topic "Reviving the Urban Green Spaces". Second lecture of the series was delivered by Mr. Pankaj Sekhsaria, Environmentalist and writer from Kalpaviksh, Hyderabad on 26th November 2015 on " In an India of the Future, what future for Andaman and Nicobar Islands"

Sálim Ali Trophy Nature Competitions 2015-16 prize distribution ceremony was held at Champion Hall, CASFOS, Forest College Campus, R. S. Puram, Coimbatore on Sunday, 20th March 2016 at 10:00 AM. Dr. K. Sankar, Director, SACON presided over the function and Dr. P. Pramod, Principal Scientist, presented the background information and report of the Sálim Ali Trophy Nature Competitions. Dr. K. Ravichandran, IFS, Conservator of Forests, A&N Islands, the Chief Guest, gave away the prizes and trophies to the winners. In total, 120 students from 17 schools received the prizes. Kongu Vellalar Mat. Hr. Sec School, Karumathampatti won the overall Champions Trophy and honoured with the Sálim Ali Trophy for the Sálim Ali Trophy Nature Competitions 2015-16. Bharathi Mat. Hr. Sec. School, Thadagam Road, Coimbatore received the first runner-up title, whereas G.D. Mat. Hr. Sec School, Coimbatore received the second runner-up title.

Dr. P. Pramod, neosacon@gmail.com

National Nature Camping Programme – Coimbatore, Tamil Nadu

National Nature Camping programme is an initiative of the Ministry of Environment and Forests in environment education which is aimed at creating greater awareness, understanding and empathy of children with and for environment. Through this initiative it is hoped that every child who goes through middle school (Classes 6th to 8th) will get at least one opportunity for a 2-3 day camping experience during these years, so as to motivate them towards conservation-oriented lifestyles; to encourage qualities of leadership, exploration, nature observation . The 'Nature experience' to children and teachers has huge potential to trigger the sensitivity towards nature appreciation and conservation, leading to positive environmental actions at different levels.

The pilot phase of this project happened across the country. About 70 camps were allotted to various organisations and institutions throughout the country out of which seven camps were conducted in Sálim Ali Centre for Ornithology and Natural History (SACON), Anaikatty, Coimbatore, between 20th August and 30 September 2016. Of eight, six camps were conducted for the regular school children and the last one camp for the 'special children'. The feedback received from campers was excellent. All of them have taken some vacation assignment to watch nature in their own places and will to report to SACON during the school reopening. It was exciting to observe and report the change in attitude, behaviour and perception visible in the students within the two and half days of camps. The most exiting aspect is the way the children with mental disabilities responded when they encountered the natural world in proximity.

Dr. P. Pramod, neosacon@gmail.com

Envis Centre on Wetland Ecosystems Including Inland Wetlands

The Environment Information System (ENVIS) is an initiative by the MoEF & CC to collect, collate and disseminate information on several concerns related to environment. The SACON ENVIS was is awarded 'A-grade' for the second consecutive year i.e. 2015-16.

The website www.saconenvis.nic.in is the primary source for disseminating wetland information for the masses. The website is regularly updated (~@ 50 articles / month) with information pertaining to theme. Subsequently the hits the website received were 40122 including 3500 unique visitors.

Coordinator : **Dr. P. A. Azeez** (Since 15/03/2016),
Dr. Goldin Quadros (Till 14/03/2016)
Envis Team : **Dr. B. Hemambika, Ms. A. Julffia Begam, Mr. A. Srinivasan,**
Project Duration : **Long term**
Budget : **`13,00,000/-**
Funding source : **MoEF & CC**
Current Status : **Ongoing**

The SACON ENVIS functions as per the mandate and regularly produces knowledge products. During the reporting period, four issues of the "Sarovar Saurabh" SACON-ENVIS Newsletter were published. The other knowledge products include posters on Wetlands: Ecology & Conservation, World Environment Day, World Rivers Day, World Habitat Day, World Wetlands Day and World Water Day. The Desk Calendar (2016) is on the theme "Wetlands & Species". Via this, we disseminate information on the wetland dependence of the species as well as important environment commemorative days. Another important publication for the year was the book "Glimpses to the Biodiversity of RAMSAR Sites in India" released by Shri. Prakash Javadekar, Hon'ble Minister, Union Ministry of Environment, Forest & Climate Change, Government of India during the inauguration of the SACON Silver Jubilee Celebrations held on 28/01/2016.

Keeping with the objectives of reaching out, the SACON-ENVIS team has participated in programs that includes direct community involvement, as shown below:

i) "National Seminar on Wetlands: Present Status, Ecology & Conservation" at Maharishi Dayanand College of Arts, Science & Commerce, Mumbai on 12/08/2015. A poster "Wetlands: Ecology & Conservation" was released

by the Vice-Chancellor of Mumbai University at the conference attended by 250 delegates.

ii) Wildlife Week was celebrated at Vidhya Karthik Hall, Tiruppur on 02/10/2015, where the State Minister for Environment and Forest, Tamil Nadu Shri M.S.M. Anandhan released "World Habitat Day 2015" poster and visited the SACON ENVIS exhibits. The event attended by over 5000 school students from Tiruppur had a firsthand learning experience interacting with the ENVIS team.

iii) As part of the National Program of participation in the Science Express, the SACON-ENVIS team exhibited and distributed knowledge products and released "World Water Day Poster 2016" during its halt at Palakkad Junction on 22- 23/03/2016.

iv) The SACON-ENVIS team has also attended two capacity building workshops namely the "Android Workshop" at SKCET, Coimbatore on 14/05/2015; Hands on Training on Bhuvan Portal at NRSC, Hyderabad during 28– 29/07/2015.

Dr. P. A. Azeez, azeezpa11@gmail.com

ACADEMIC PROGRAMMES

List of Ph.D. scholars registered / Ph.D. Degree awarded during the year 2015-16

ZOOLOGY

Name of the Supervisor	Name of the Research Scholar	Degree	Topic	Status
Dr. P. Pramod	L. Joseph Reginald	Ph.D.	Diversity and habitat preference of bats (Order Chiroptera) of Coimbatore	Ongoing
	A. P. Zaibin	Ph.D.	Insular biogeography of Nicobar Islands from a bird community perspective	Ongoing
	M.Suhirta Muhil	Ph.D.	Ecology of Odonates in the Coimbatore	Ongoing
	S. Srinidhi	Ph.D.	Assessment of impact and management strategies of the bird hazards to aircraft in India.	Ongoing
	J. Chaithrashree	Ph.D.	Dynamics of biodiversity in paddy fields: A study of indicator communities	Ongoing
	C. Divyapriya	Ph.D.	Spatial and temporal variations of call & song repertoire in Common Iora in selected locations of Westeren Ghats.	Ongoing
Dr. S. Manchi Shirish	Akshaya Mane	Ph.D.	Population dispersal studies of Edible nest Swiftlet in Andaman & Nicobar Islands, India	Ongoing
	S. P. Sankar	Ph.D.	Life history strategies of two socially distinct birds of Western Ghats, India	Ongoing
Dr. H. N. Kumara	K. Santhosh	Ph.D.	Status, ecology and conservation of Lion Tailed Macaque in Sirsi-Honnavara forests of Western Ghats, Karnataka	Submitted
	Arijit Pal	Ph.D.	A study on reproductive behavior of Nicobar long tailed macaque (*Macaca fascicularis umbrosa*) in Nicobar Islands, India	Ongoing
	Aditi Mukherjee	Ph.D.	Burrow use patterns by terrestrial vertebrates in Keoladeo National Park, Bharatpur, India	Ongoing
	Avadhoot D. Velankar	Ph.D.	Population status and resource utilization of Nicobar long-tailed macaque *Macaca fascicularis umbrosa* in Nicobar Islands, India	Ongoing
	Partha Sarathi Mishra	Ph.D.	Aggression and post-conflict affiliation in Nicobar long-tailed macaques *Macaca fascicularis umbrosa*	Ongoing
	Joydeep Shil	Ph.D.	Feeding ecology and social structure of golden langur *Trachypithcus geei* in secondary forests of Chakrashila Wildlife Sanctuary, India.	Ongoing

BOTANY

Name of the Supervisor	Name of the Research Scholar	Degree	Topic	Status
Dr. P. Balasubramanian	P. Manikandan	Ph.D.	Study on nest tree preferences by cavity nesting birds in the riverine forests of Athikadavu Valley, Western Ghats	Ongoing
	L. Prakash	Ph.D.	A study on the flora of Sathyamangalam Tiger Reserve, Eastern Ghats.	Ongoing
ENVIRONMENTAL SCIENCES				
Dr. P. A. Azeez	J Ranjini	Ph.D.	Adaptation and tolerance of birds to urbanization - a critical evaluation with emphasis on life strategy	Awarded
	K. A. Nishadh	Ph.D.	Particulate air pollution data for Coimbatore, India: real time monitoring and modeling with data-interoperability measures	Ongoing
	R. Chandran	Ph.D.	Environmental education: impact on higher education	Ongoing
	J. V. Jins	Ph.D.	Reptile communities of Agasthiyamalai Hills, Western Ghats	Ongoing
	Madhumita Panigrahi	Ph.D.	Bird communities of Agasthiyamalai Hills, Western Ghats	Ongoing
	Mohd. Zeeshan Malik	Ph.D.	Assessment of environmental changes in three districts (Jammu, Rajouri & Ramban) representing altitudinal gradients in Jammu region.	Ongoing
Dr. S. Muralidharan	K. Ganesan	Ph.D.	Comparative study on pesticide residues in select components of an agro ecosystem adopting organic and chemical farming in Padayetti village, Palakkad District, Kerala	Awarded
	V. Kirubhanandhini	Ph.D.	Levels of metal contamination in select species of birds	Ongoing
	Mythreyi Devarajan	Ph.D.	Impact of pesticides on select components of a rice field ecosystem	Ongoing
	Aditya Roy Ashimkumar	Ph.D.	Effects of environmental contaminants on ecology and breeding biology of *Gyps* vultures	Ongoing

Name of the Supervisor	Name of the Research Scholar	Degree	Topic	Status
Dr. P. R. Arun	S. Ramesh Kumar	Ph.D.	Environmental Impacts of Wind power generation with special reference to birds in Kutch District, Gujarat	Ongoing
	S. B. Santhakumar	Ph.D.	Impact of developmental activities on bird communities along Sutlej river basin, Himachal Pradesh	Ongoing
	M. Samsoor Ali	Ph.D.	Waterbird assemblage of human-made wetlands in Bhachau Taluk, Kutch District, Gujarat, India	Ongoing
	Anoop V.	Ph.D.	Impacts of Wind power generation on select faunal components of a dry deciduous forest at Harpanahalli, Davangere	Ongoing
Dr. Shomita Mukherjee	Pankaj Koparde	Ph.D.	Molecular phylogeny and comparative phylogeography of owlets in India	Ongoing
Dr. S. Babu	S. Suresh Marimuthu	Ph.D.	Occupancy and distribution pattern of owls in Andaman Islands with special reference to community assembly rules	Ongoing
	G. Babu Rao	Ph.D.	Assemblage of Shorebirds in the Sindhudurg District, Maharashtra	Ongoing

Publications in Peer Reviewed Journals

National

Ali A. M. S., Kumar R.S. and Arun P. R. (2015). Sighting of Greater Scaup Aythya marila and Pallid Scops-Owl Otus brucei In Eastern Kutch of Gujarat, India. Journal of Bombay Natural History Society 112(1): 30-32.

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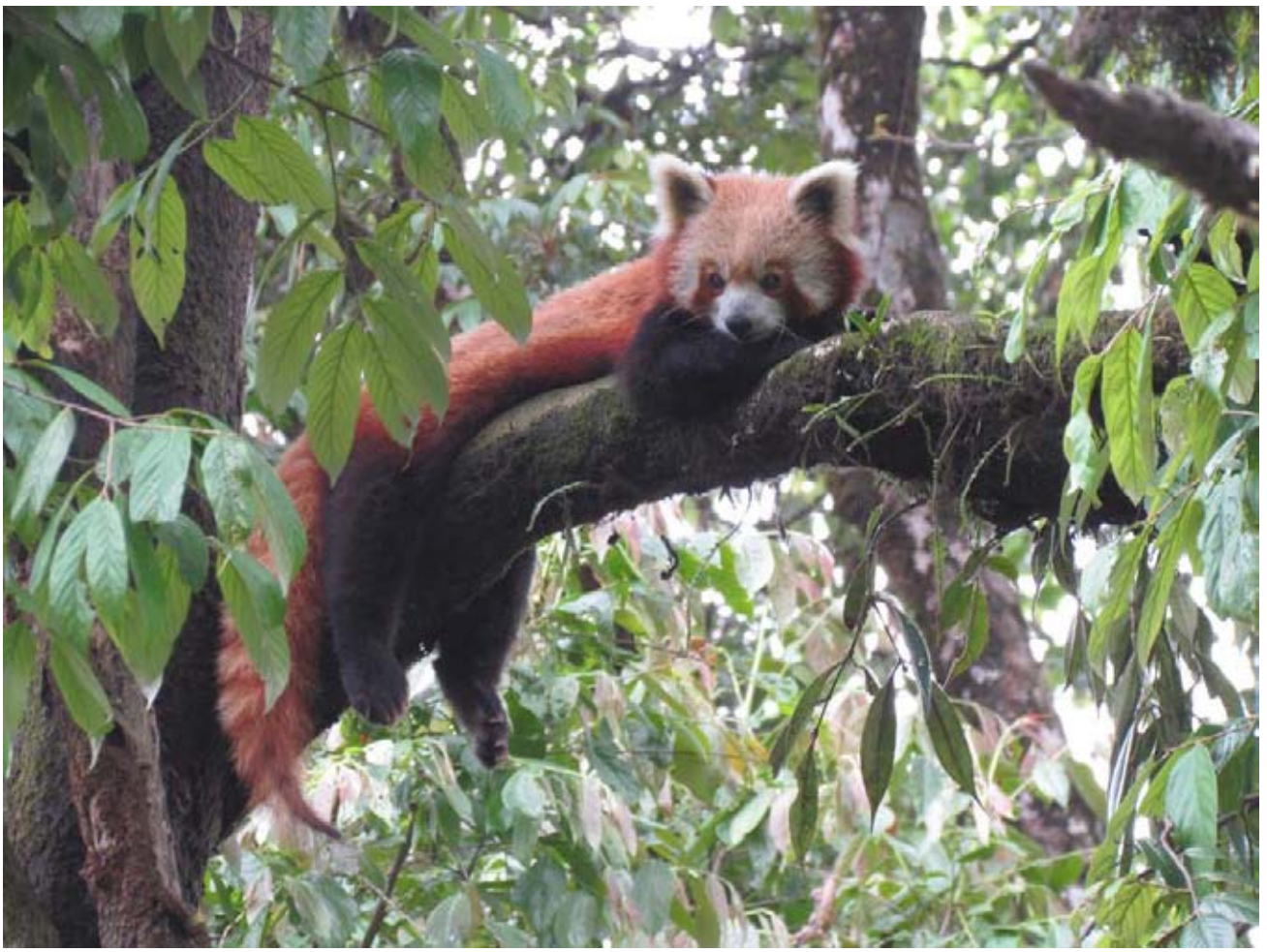

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National

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International

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Balasubramanian P., Anbarasu C. and Prakash L. (2015). Status and distribution surveys of threatened plant taxa in Tamil Nadu, Report submitted to Tamil Nadu Forest Department, Chennai. SACON, Coimbatore. 183 p.

Books

Balasubramanian, P., Manikandan, P., Prakash, L. and Anbarasu, C. (2015). Flowering plants of SACON campus in the Anaikatty hills, Western Ghats. Salim Ali Centre for Ornithology and Natural History, Coimbatore. p 220. ISBN 978-93-5212-525-8.

Goldin Quadros, Hemambika B., Julffia Begam A., Srinivasan A. and Azeez P.A. (2015). Glimpses to the biodiversity of Ramsar sites in India. Salim Ali Centre for Ornithology and Natural History, Coimbatore for SACON ENVIS. ISBN: 978-93-5254-302-1.

Seminars/conferences/workshops/meetings participated

Arun, P.R. (2015). National seminar on Climate change and the dwindling resources of Western Ghats on 15th & 16th December 2015. MES Keveeyam College, Valanchery, Kerala.

Arun, P.R. (2015). Training Programme on Mainstreaming Biodiversity in Energy Sector from 03-05 August 2015 at Wildlife Institute of India (WII), Dehradun, Uttarakhand.

Arun, P.R. (2015). National seminar on The Trends and Status of Biodiversity in Kerala on 29th - 30th October 2015, Brennen College, Thalasseri, Kerala.

Arun, P.R. (2016). National Conference on Trends and Innovations in Biological Research, 16th Feb 2016. MES Kalladi College, Mannarkkad, Kerala.

Goldin Quadros (2016). International Conference on Ecosystem Services of Wetlands: Ardrabhumi 2016. February 16-17, V.P.M.'s B. N. Bandodkar College of Science, Thane, Maharashtra, India.

Goldin Quadros (2015). 'Technical consultation for preparation of ICZM plan' organised by GEC, Govt. of Gujarat on 17th April 2015 at Gandhinagar, Gujarat.

Goldin Quadros (2015) GEF National Workshop for evaluation and designing of Small Grants Program organised by MoEF&CC on 12-13 May, 2015 at New Delhi.

Goldin Quadros (2015). BNHS - ENVIS advisory committee meeting held on 13th July, 2015 at Hornbill House Mumbai.

Goldin Quadros (2016). National Evaluation workshop for ENVIS centers held from 17th to 20th February, 2016 at MoEF& CC, New Delhi.

Karunakaran P. V. (2015). Talk on "Biodiversity Conservation" talk delivered as part of the Training Programme on Environmental Studies for the Assistant Professors, Avinashilingam University, Coimbatore on 1st May 2015.

Karunakaran P. V. (2015) "Approach for Landscape Level Conservation in India" talk to Trainee Officers (ACF) of CASFOS on 26th May 2015.

Karunakaran PV. "Mountains the land of Maxima" Invited talk on the eve of International Mountain Day at IFGTB on 11th December 2015.

Karunakaran P.V. (2016). " Mountain Wetlands of Western Ghats" Key Note address during the occasion of Commemoration of International Wetland Day at TNFA on 5th February 2016.

Karunakaran P.V. (2016). "Landscape Ecology- an approach for Natural Resource Management" talk delivered for the officer Trainees of TNFA on 10th March 2016

Karunakaran P.V. (2016). Workshop on Grassland Restoration by Kerala Forests and Wildlife Department (Wildlife Division, Munnar) 18th February 2016.

Shirish Manchi S. (2016). A Participatory Natural

Resource Management Program from the Subterranean Wetland Ecosystem in Andaman and Nicobar Islands. International Conference on Ecosystem Services of Wetlands: Ardrabhumi 2016. 17th February 2016.

Shirish Manchi S. (2016). Conservation Biology: Case studies of Bird Conservation. 3rd DST-SERB School in Avian Biology. 5th October 2016.

Shirish Manchi S. (2016). Bird Capture and Banding. 3rd DST-SERB School in Avian Biology. 5th October 2016.

Talks delivered

Arun, P.R. Delivered a lecture to CASFOS trainees- on EIA, at SACON, 18th September 2015.

Arun, P.R. Delivered a lecture to CASFOS Trainees- on EIA case studies, at SACON, 8th September 2015.

Arun, P.R. Delivered a lecture at CASFOS in Training-cum-Workshop on 'Legal issues in Forestry & 'wildlife' for the in-service SFS Officers of various State Forest Departments. 13th October 2015.

Arun, P.R. Delivered lecture on 'Environmental Impacts of Wind power' At 17th International Training Course on "Wind Turbine Technology and Applications" at National Institute of Wind Energy (NIWE), Chennai. 23rd February 2016.

Babu, S. Delivered a talk on "bird watching" during the orientation program on bird watching for woman. The program was organized by Kerala Forest Research Institute, Thrissur during 7th – 8th May, 2015.

Babu, S. Delivered a talk on "Threatened Birds of India –and their conservation during the Course work on Bird Conservation & EIA for Forest Range Officer Trainees of CASFOS. The program was organized by SACON during 14th -19th September, 2015.

Balasubramanian, P. Talk and discussion on "Role of Birds in Ecosystem Maintenance" to National Nature Camping Programme participants at SACON, 1st September 2015.

Balasubramanian, P. Lecture delivered on "Bird Conservation" to CASFOS Trainee officers.15th September 2016.

Balasubramanian, P. Lecture delivered on "Role of Birds in Forest Regeneration" to CASFOS Trainee officers. 7th December 2015.

Goldin Quadros. Delivered a Popular talk on 'Importance of wetlands and the need for monitoring wetlands" during the SOCON - 15 festival organized by VIT, Vellore on 4th September, 2015.

Goldin Quadros, Delivered Dr. Sandeep Joshi Memorial lecture titled "Public participation in conservation of Creeks and Estuary". during the National Conference "Coastal and Estuarine Habitat Restoration" on 23rd September, 2015. Organized by Nauashad Ali Sarovar Samvardhini (NASS) at Thane Maharashtra.

Jayapal, R. Delivered a talk on "Population Monitoring & Survey Methods of Birds" to officer-trainees of CASFOS at SACON on 16th September 2015.

Jayapal, R. Delivered a talk on "Birds of India: An Introduction" to the environmental science teachers organized by Isha Foundation and SACON Nature Education Division at SACON on 21st December 2015

Jayapal, R. "Status and Distribution of Birds of the Western Ghats" – an invited lecture at the Centenary Seminar on the Fauna of the Eastern Ghats and the Western Ghats organized by Zoological Survey of India (ZSI) at Madras School of Economics, Chennai on 3rd March 2016.

Karunakaran P.V. "Mountain Wetlands of Western Ghats" Key Note address during the occasion of Commemoration of International Wetland Day at TNFA on 5th February 2016.

Karunakaran P.V. "Approach for Landscape Level Conservation in India" talk to Trainee Officers (ACF) of CASFOS on 26th May 2015.

Karunakaran P.V. "Landscape Ecology- an approach for Natural Resource Management" talk delivered for the officer Trainees of TNFA on 10th March 2016.

Karunakaran P.V. "Mountains the land of Maxima" Invited talk on the eve of International Mountain Day at IFGTB on 11th December 2015.

Karunakaran P.V. Talk on "Biodiversity Conservation" talk delivered as part of the Training Programme on Environmental Studies for the Assistant Professors, Avinashilingam University, Coimbatore on 1st May 2015.

Kumara H.N. Wildlife Monitoring and Population Census Protocols. Talk delivered in workshop on "Wildlife Management" for SFS officers at CASFOS, Coimbatore. 7th July 2015.

Kumara H.N. Ecological Census Techniques. Talk delivered in "General Refresher Course" for SFS officers and Senior Forest Range Officers at CASFOS, Coimbatore. 14th December 2015.

Kumara H.N. Behavioural Ecology and Conservation Issues of Indian Primates. Plenary talk at YETI-2016. YETI (Young Ecologists Talk and Interact) was held in Amity University, 17th -20th January 2016, Delhi. 18th January 2016.

Training Programme/Workshop/Meeting

Summer Training Programme on Laboratory Procedures on Ecotoxicological Studies

Summer Training Programme on "Laboratory Procedures on Ecotoxicological Studies" was organized during May - June 2015 by the Division of Ecotoxicology. Five UG students from institutions, namely Karunya University (4) and University of Madras (1) attended this programme. Students were given hands-on training on analytical instruments; Gas Chromatograph, High Performance Liquid Chromatograph, Atomic Absorption Spectrophotometer, UV Spectrophotometer and Ultracentrifuge. Trainees were also taught laboratory procedures, basic principles and general laboratory protocols pertaining to toxicology.

Training Programme on Bird Conservation and Environment Impact Assessment (EIA)

The SCCS is the largest student conference in India and is held in Bengaluru each year. This conference provides a platform for young researchers in the field of Biodiversity Conservation to present, share and discuss their work. Major attractions to the Conference include the various workshops, plenary talks and discussions that enable students to hone their skills and interact with practicing experts in topics that are of prime importance in this field. The SCCS was conducted in Bengaluru during 8th to 11th September 2015.

Two workshops on Conservation Genetics, including a two and half hour basic and a day-long advanced, were conducted for students, covering the principles of population genetics with a focus on the Hardy-Weinberg equilibrium and some of its wider applications in Conservation Biology. These are taught through interactive games and case studies, including methods widely used for sampling and analysis. Main aims and goals: To introduce participants to theoretical concepts and analytical tools for a clearer understanding of the processes that drive genetic patterns. The workshop was organized by Dr. Shomita Mukherjee, SACON, Dr. Subhankar Chakraborty I.I.Sc., Bengaluru and Dr. Vishnupriya Kolipakam, Wildlife Institute of India, Dehra Dun

Workshop on Conservation Genetics

A five day training programme on "Bird Conservation and EIA" was organized in SACON for the Forest Range Officer trainees of the Central Academy for State Forest Services (CASFOS) during 14th to 19th April 2015. A total of 32 officer trainees from different states attended the training programme. The programme included, class room lectures, lab and field visits. Lectures on various topics including bird census techniques, conservation of threatened birds and EIA studies etc were delivered by faculty members of SACON. The programme was co-ordinated by Dr. P. Balasubramanian and Dr. Rajah Jayapal.

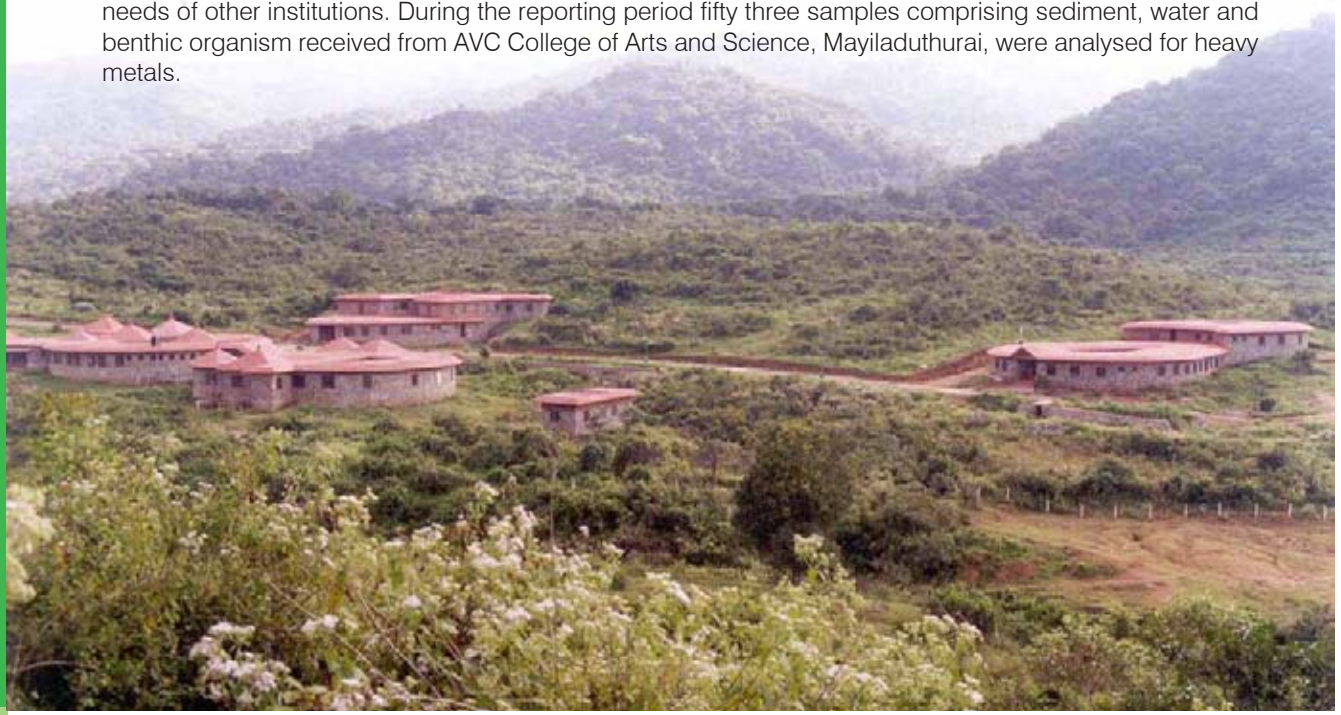
INFRASTRUCTURE

SACON is situated at Anaikatty in the periphery of the Western Ghats, one of the 'hot spots' of biodiversity in the world. Several Protected Areas (PAs) in the states of Kerala, Tamil Nadu and Karnataka in the Western Ghats, are only a few hours drive from the campus. SACON campus also offers great opportunities for long-term studies on its varied avifauna, other wildlife and on biological principles of ecosystems. SACON has several temporary field stations in various parts of the country set up according to the requirements of research projects.

SACON created two shallow static water tanks of 4500 liters capacity each in the campus to cater to the needs of birds and wild animals. These strategically located water bodies are being utilized by elephant, spotted deer, wild pig, gaur, and various birds. The tanks are connected with fresh water supply for regular replenishment.

Laboratory: Currently, our laboratory is equipped with 1) UV-Vis Spectrophotometer, Perkin Elmer Model Lambda 35, 2) HPLC Agilent Technology Model 1100 series with DAD and Florescence detector, 3) Water Quality analyzer - Multi Parameter TROLL - 9500, Portable PC testr35, Eutech instruments, 4) Ultra Deep Freezer (-80°C), New Brunswick, Model U 410 Premium, 5) Deep freezers (-20°C), Carrier, Model CHP-30, Cryo Make, and refrigerators Model LG and Samsung, 6) Flame Atomic Absorption Spectrophotometer (AAS) Perkin Elmer, Model 3300 with 13 lamps, 7) Mercury Hydride Generator, Perkin Elmer, 8) Gas Chromatograph, Hewlett Packard Model 5890 Series II with three detectors, (Electron Capture Detector - ECD, Nitrogen Phosphorous Detector - NPD and Flame Photometric Detector - FPD), 9) ANG generator, Claind, Model ANG 2381HC, 10) Microwave Digestion System, Milestone Model 1200, 11) Dissolved Oxygen (DO) Analyzer, 12) Biochemical Oxygen Demand (BOD) Incubator, Sanyo Model Mir 154, 13) Flame Photometer, Systronics 128, 14) Vertical Laminar Flow Chambers, 15) Respirable Dust Samplers, 16) Ultra Centrifuge, 17) Microprocessor research centrifuge, 18) Walk-in cold room, 19) Rotary Flask Evaporator Model Cyberlab RE-10, 20) Micrometer, 21) Digital Camera, 22) Thermo-hygrometer, 23) All Quartz Double Distillation unit, 24) Millipore water purification system, 25) Hot-air Oven, 26) Binoculars, 27) Induction Hot Plate, 28) Digital Caliper, 29) Soxhlet Mantle, (30) Ultrasonic water bath, Crest 275, 2.7 lts, 31) Desiccators, 32) Blenders, 33) Rotary spinner, and 34) Inverted microscope.

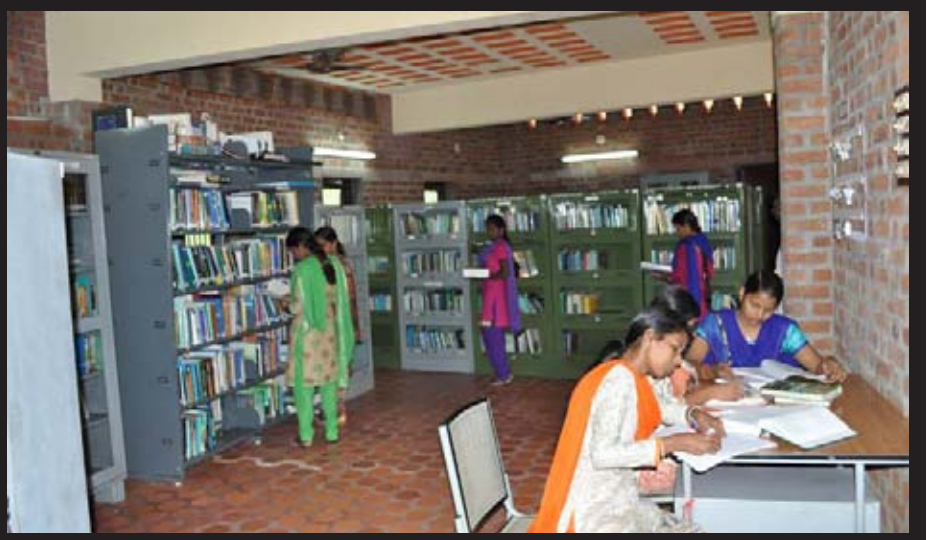
Apart from utilizing the laboratory for own research projects, SACON laboratory facilities also cater to the needs of other institutions. During the reporting period fifty three samples comprising sediment, water and benthic organism received from AVC College of Arts and Science, Mayiladuthurai, were analysed for heavy metals.



Construction of Additional Hostel Building

Over the years the number of research scholars have been increasing in SACON. In order to create adequate accommodation facilities, a new block of hostel with a capacity to accommodate 8 inmates, was constructed with the financial support of Pirojsha Godrej Foundation. The hostel building was dedicated by Shri Prakash Javadekar, Hon'ble Minister of State (I/C), Ministry of Environment, Forest & Climate Change, Government of India & President, SACON Society on 28th January 2016.

Library and documentation: SACON library has 3263 books, 2508 back volumes of journals, 2706 maps, 91 CD/DVDs, 101 technical reports, 34 PhD theses, 62 current periodicals (National - 40; International - 22), and online subscription of JSTOR Archive - Biological Science. Facility for literature searches has been provided to all the staff and students. The library facilities are accessible to students, scholars and scientists from other institutions / organizations / universities and to any interested person.



Details of Ongoing and Completed Research Projects During The Financial Year 2015 -16

Sl. No.	Project title	Investigator	Collaborating agencies	Research Fellows	Duration	Budget (Rs.)	Funding source	Date of commencement	Date of completion	Current status
1.	Understanding Dispersal Patterns in the monomorphic Edible-nest Swiftlet of Andaman Islands using biotechnological tools	PI: Dr. S. Manchi Shirish CoPI: Ram Pratap Singh	Nil	Yet to be engaged	3 Years	45,78,200/-	Department of Biotechnology, Govt. of India	Jan-2016	Jan-2019	Ongoing
2.	Status, Ecology and Conservation of Narcondam Hornbill *Aeceros narcondami* on Narcondam Island, India	Dr. S. Manchi Shirish	Nil	Nil	1.5 years (Extended upto Dec-2016)	6,07,200/-	Ministry of Environment, Forest and Climate Change, GoI	Nov-2010	Dec-2016	Ongoing
3.	Conservation of the Andaman Serpent-eagle *Spilornis elgini* in the Andaman Islands: Phase – I	Dr. S. Manchi Shirish	Nil	Shivkumari Patel	2 years	11,56,500/-	Raptor Research and Conservation Foundation, Mumbai	Dec-2014	Dec - 2016	Ongoing
4.	Mapping key nesting sites of coastal and marine birds for identification of Ecologically Sensitive Areas along Indian coasts	PI : Dr. Rajah Jayapal Co:PIs Dr. S. Babu, Dr. P. A. Azeez, and Dr. Goldin Quadros	National Centre for Sustainable Coastal Management (NCSCM)	N. Mohamed Ibrahim & Ms. V. Gayathri	1 Year	4,25,000/-	National Centre for Sustainable Coastal Management (NCSCM)	July - 2015	July-2016	Ongoing

5.	Ecological species sorting in relation to habitat structure in the small cat guild of Eaglenest Wildlife Sanctuary, Arunachal Pradesh.	PIs: Dr. Shomita Mukherjee, Dr. P. V. Karunakaran, Dr. Ramana Athreya	Indian Institute of Science Education and Research, Pune	Prafull Choudhary	3 Years	48,08,000/-	Department of Science and Technology, India	Nov-2013	Oct 2016	Ongoing
6.	Determining the taxonomic and conservation status of the Forest Owlet (*Heteroglaux blewitti*).	Dr. Shomita Mukherjee, Dr. V.V. Robin and Dr. Prachi Mehta	National Centre for Biological Sciences, Bengaluru and Wildlife Research and Conservation Society, Pune.	Pankaj Koparde	3 Years	30,52,000/-	Department of Biotechnology, India	Apr-2013	Jul -2016 (with no cost extension)	Ongoing
7.	Social organization, behaviour and phylogeography of *Macaca fascicularis umbrosa* on the Nicobar Islands, India	PI: Dr. H. N. Kumara CoPIs: Prof. Mewa Singh & Dr. Shomita Mukherjee	CES Laboratory, Bangalore	Mr. S. Vinoth, Partha Sarathi Misra & Avadhoot D. Velankar	3.5 years	38,54,000/- lakhs	Science and Engineering Research Board (DST)	July 2012	January 2016	Completed
8.	Spatio-temporal burrow use patterns by vertebrates in Keoladeo National Park, Bharatpur, Rajasthan, India	PI: Dr. S. Bhupathy (Late)/ Dr. H. N. Kumara (From 30/07/2014), Co-PI: Dr. S. Manchi Shirish	Nil	Aditi Mukherjee	3 years	42,61,000/-	Dept. of Science and Technology, Govt. of India	June 2013	June 2016	Ongoing
9.	A comprehensive study of potential ecological impact of windmill farms on wildlife with special emphasis to avifauna in Karnataka	PIs: Dr. H. N. Kumara & Dr. S. Babu	Nil	Yet to be engaged	1.5Years	36,00,000/-	Karnataka forest department/KREDEL/NIWE	Mar-2016	Aug-2017	Ongoing
10.	Ecology of Elephant (*Elephas maximus*) in South-West Bengal including population dynamics, migratory pattern, feeding habits and human-elephant conflict	PIs: Dr. H. N. Kumara and Dr. P. A. Azeez		Yet to be engaged	3 Years	35,56,000/-	West Bengal	March 2016	March - 2019	Ongoing

Details of Ongoing and Completed Research Projects During The Financial Year 2015 -16

11.	Assessment of conflicts between peafowl and farmers in Coimbatore	PI: Dr. P. Balasubramanian	Nil	C. Anbarasu	6 months	1,00,000/-	Tamil Nadu Forest Department, Coimbatore	Jun-2015	Nov-2015	Completed
12.	Study on ecosystem requirements of the Hornbills (Great pied, Malabar pied, Indian grey and Malabar grey) in Munnar Landscape Project Area	PI: Dr. P. Balasubramanian Co PI: Dr. P. V. Karunakaran	Nil	L. Prakash & Mohamed Ibrahim	1 Year	3,30,000/-	UNDP, New Delhi	Jan-2015	Dec-2015	Discontinued
13.	Developing site-specific eco-restoration protocol based on existing community requirements in Munnar Landscape Project Area	PI: Dr. P. V. Karunakaran Co-PI : Dr. Mathew K. Sebastian	Nil	Anoop N. R. & Nagendran S.	1 Year	17,73,145/-	UNDP, New Delhi	Jan-2015	Dec-2015	Discontinued
14.	Land use and Management Plans for Production Landscapes in Munnar Landscape Area	PI: Dr. P. V. Karunakaran Co-PI : Dr. Mathew K. Sebastian	Nil	E. Kanthaiya Aadhavan, V. Gayathri & G. Uma	1 Year	19,71,420/-	UNDP, New Delhi	Jan-2015	Dec-2015	Discontinued
15.	Monitoring and Surveillance of Environmental Contaminants in Birds in India	PI : Dr. S. Muralidharan	Nil	K. Ganesan, K. Nambirajan & V. Kirubhanandhini	3 years	48, 36, 000/-	MoEF, Govt. of India	Mar-2010	Feb 2016	Completed
16.	Impact of Hara Wind power project of CLP Wind Farms (India) Ltd. on Wildlife including Migratory birds and Raptors at Harapanahalli, Davangere, Karnataka	PI : Dr. P. R. Arun Co-PI : Dr. Rajah Jayapal	Nil	V. Anoop	14 Months	16,46,000/-	CLP Wind Farms (India) Pvt. Ltd	Nov - 2013	May - 2015	Completed

17.	Preparation of management plan of Fudam Bird Sanctuary, Diu	PI : Dr. P. R. Arun Co-PI : Dr. Rajah Jayapal	Nil	P. Rajan	1 year	7,00,000/-	Forest Dept., Daman & Diu	Apr-2014	April - 2015	Completed
18.	Plant- Animal Community Studies in Various Landscape Elements (Birds and Butterflies) in the Munnar High range Mountain Landscape Area	PI : Dr. P. R. Arun Co-PIs : Dr. P.V. Karunakaran & Dr. P. Balakrishnan	Nil	S. Ramesh Kumar, N. Anoop Raj & N. Ramarajan	1 Year	24,90000/-	UNDP	Jan.-2015	Dec-2015	Discontinued
19.	Ecological status assessment of Palk Bay	PIs: Dr. P. A. Azeez, Dr. Goldin Quadros, Dr. M. Mahendiran & Dr. S. Shirish Manchi	Nil	Akshaya Mane, K. A. Nishadh & V. J. Jins (until Feb 2016)	8 Months	11,00,767/-	GIZ	Nov-2015	Jun - 2016	Ongoing
20.	ENVIS centre on wetland ecosystems including inland wetlands	Dr. P. A. Azeez (Since 15/03/2016) Dr. Goldin Quadros (Coordinator till 14/03/2016)	Nil	B. Hemambika, A. Julffia Begam & . A. Srinivasan	Long Term	13,00,536/-	MoEF & CC	2002	2017	Ongoing
21.	Documenting the biodiversity of Sompeta wetland, Srikakulam dt, Andhra Pradesh and developing biodiversity-mediated livelihood options for local communities.	PI : Dr. Mathew K Sebastian Co-PIs: Dr. P. R. Arun Dr. Rajah Jayapal Dr. P. A. Azeez	Nil	Ramesh Kumar	8 Months	109,500/-	Paryavaran Parirakshna Samiti, Sompeta	Mar - 2016	Oct 2016	Ongoing

Details of Ongoing and Completed Research Projects During The Financial Year 2015 -16

22.	Conducting baseline studies for Thane creek	PI : Dr. Goldin Quadros Co-PIs : Dr. P. A. Azeez, Dr. M. Mahendiran, Dr. S. Shirish Manchi & R. P. Athalye	B. N. Bandodkar College of Science, Thane	Siddhesh Bhave, Amol M H Tripathi, Prathamesh Gujarpadhye , Sonia Benjamin & Janice Vaz.	6 Months	14,95,000/-	Mangrove Cell, Maharashtra and GIZ	Nov-2015	Apr - 2016	Ongoing
23.	Carrying Out Ecotoxicology of Fishes, Crabs and Bivalves at Thane Creek	PI : Dr. Goldin Quadros Co-PIs : Dr. P. A. Azeez, Dr. M. Mahendiran, Dr. S. Shirish Manchi & R. P. Athalye	B. N. Bandodkar College of Science, Thane	Siddhesh Bhave, Amol M H Tripathi, Prathamesh Gujarpadhye , Sonia Benjamin & Janice Vaz	6 Months	3,94,000/-	Mangrove Cell, Maharashtra and GIZ	Nov-2015	Apr - 2016	Ongoing
24.	Assessment of the morphological diversity and the ecological patterns in the near threatened colonial water birds across Indian sub-continent using novel approach	PI : Dr. M. Mahendiran	Nil	Rajneesh Dwevedi	3 years	16, 45, 000/-	Dept. of Science and Technology, Govt. of India	May-12	May-15	Completed
25.	Owl Assemblage and occupancy in Andaman archipelago, India	PI: Dr. S. Babu Co PI: Dr. H. N. Kumara	Nil	S. Suresh Marimuthu & N. Rajeshkumar	3 years	41, 17,000/-	Science and Engineering Research Board (DST)	Jun-13	Jun-16	Ongoing

26.	Assessing the status and distribution of avifauna within in the coastal talukas of Sindhudurg district Maharashtra	PI: Dr. S. Babu Co PI: Dr. Goldin Quadros	Nil	G. Babu Rao, Amit J Patil, Bhupendra B Shirke & Rajan Surve	2 years	31,32,000/-	GOI-UNDP-GEF-Mangrove Cell, Mumbai	Sep-2014	Sep-2016	Ongoing
27.	Exploring Nature through Birds	Dr. P. Pramod	Nil	C. Divya Priya		18,04,000/-	Dept. Science and Technology (NCSTC)	June 2013	May 2016	Ongoing
28.	Nature Education Activities for Coimbatore	Dr. P. Pramod	Nil	--	1 year	1,82,648/-	SACON Self fund raising	April 2015	March 2016	Ongoing
29.	National Nature Camping Programme – Coimbatore	Dr. P. Pramod	Nil	Chaithra Shree J. & Suhirtha Muhil	1 year	3,60,000/-	Ministry of Environment, Forest and Climate Change, GoI	April 2015	March 2016	Completed

Sálim Ali Centre for Ornithology and Natural History (SACON)

Anaikatty, Coimbatore– 641 108, Tamil Nadu, India.
Tele : 91 0422 2203100, 109
Fax: 91 0422 2657088
Email: *salimali@sacon.in, salimalicentre@gmail.com*
Website: www.sacon.in

UDHAYAM 98422 31551