SÁLIM ALI CENTRE FOR ORNITHOLOGY AND NATURAL HISTORY

Annual Report

2016-2017

Published by

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Eagle nest Small Cat Team : Pg 27
Ms. Aakriti Singh : Pg 29
Project Camera Trap : Pg 30
Dr. C. Muthumperumal : Pg 31
Dr. P. V. Karunakaran : Pg 32
Ms. Mythreyi Deverajan : Pg 33
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Annual Report
2016 - 2017

Dr. Sálim Ali

1896 - 1987

Background 1
Executive Summary 2
Organogram 7
Divisions 16

Ornithology

Mapping key nesting sites of coastal and marine birds for identification of Ecologically Sensitive Areas along Indian coasts 16

Owl assemblage and occupancy in Andaman archipelago, India 18

Assessing the status and distribution of avifauna within the coastal talukas of Sindhudurg District, Maharashtra 19

Conservation Ecology

Understanding dispersal patterns in the monomorphic Edible-nest Swiftlet of Andaman Islands using biotechnological tools 20

Status, ecology, and conservation of Narcondam Hornbill (*Aceros narcondami*) on the Narcondam Island, India 21

Conservation of the Andaman Serpent Eagle (*Spilornis elgini*) in the Andaman Islands: Phase – I 22

Identifying Indian cavity nesters most vulnerable to the loss of large trees 23

Assessing anthropogenic threats to large carnivore population in the Western Ghats part of Tamil Nadu 24

Conservation Biology

25 Survey of small cats in Sanjay Gandhi National Park, Mumbai

26 Determining the taxonomic and conservation status of the Forest Owlet (*Heteroglaux blewitti*)

27 Ecological species sorting in relation to the habitat structure in the small cat guild of Eaglenest Wildlife Sanctuary, Arunachal Pradesh

28 A comprehensive study of potential ecological impact of windmill farms on wildlife with special emphasis on the avifauna in Karnataka

29 Ecology of Elephant (*Elephas maximus*) in south-west Bengal including population dynamics, migratory pattern, feeding habits and human-elephant conflict

30 Spatio-temporal burrow use patterns by vertebrates in Keoladeo National Park, Bharatpur, Rajasthan, India

Painted Bush Quail
(*Perdicula erythrorhyncha*)

Contents

Landscape Ecology

Ecological investigations on five selected endemic trees and their conservation strategies in the forests of Tamil Nadu, India 31

Habitat Assessment of Mangalavanam Bird Sanctuary 32

Ecotoxicology

Polycyclic Aromatic Hydrocarbons (PAHs) contamination in Palikaranai wetland, Chennai; fish as an indicator 33

Surveillance of waterfowl at Nalabana Bird Sanctuary, Chilika Lake, Odisha 34

Avian Physiology

Ecological baseline study for Palk Bay 35

Phthalates in the environment: Development of an In vitro model for studying the impacts of low levels on male reproduction 36

Reproductive seasonality and sperm cryopreservation in the male tufted deer (*Elaphodus cephalophus*) 37

Influence of cooling and thawing conditions and cryoprotectant concentration on frozen-thawed survival of White-naped Crane (*Antigone vipio*) spermatozoa 38

Development of a microfluidic gas-liquid interphase 3-D tissue explant culture chip for fertility preservation 39

Extension

40 Documenting the biodiversity of Sompeta wetland, Srikakulam District, Andhra Pradesh and developing biodiversity-mediated livelihood options for local communities

Wetland Ecology

42 Conducting baseline studies for Thane creek

44 Carrying out the ecotoxicology of fishes, crabs and bivalves at Thane Creek

45 Preparing a brief document on wetlands in the forest areas of Maharashtra

Nature Education

47 Nature Education Activities in Sacon Campus

48 Sacon Silver Jubilee Lecture Series

48 Sálim Ali Trophy Nature Competitions

49 Sacon Wildlife Week Celebrations

49 National Nature Camping Programme

50 Exploring Nature Through Birds

51 Academic Programmes

54 Publications

61 Training Programmes /Workshops / Meetings

65 Infrastructure and Facilities

73 Details of Ongoing and Competed Projects /activities

82 Audit Report

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 (MoEFCC), 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, MoEFCC. 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

"To help conserve India's biodiversity and its sustainable use through research, education and people's participation, with birds at the centre stage"

OBJECTIVES


Ashy Prinia
(*Prinia socialis*)

- 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 2016-2017 was highly dynamic for SACON in terms of outputs. During the reporting year SACON completed 16 research projects while 13 projects are ongoing. The Ornithology Division completed three studies 1) “Mapping nesting sites of coastal and marine birds for identification of Ecologically Sensitive Areas (ESA) along Indian coasts”. In total, 56 species of coastal and marine birds known to regularly nest along the Indian coasts were shortlisted and over 800 records of their nesting were collected from secondary sources. Ninety sites were shortlisted for consideration as ESAs. 2) “Owl assemblage and habitat occupancy in Andaman archipelago”. This study estimated the spatial distribution of 5 species of owls. The Oriental Scops Owl was recorded in >70% of the Islands surveyed. Andaman Scops Owl and Andaman Hawk Owl were recorded in less than 30% of the Islands. Scops Owl was a habitat specialist while the Hume's Hawk Owl and Oriental Scops Owl were habitat generalists in these Islands. 3) “Status and distribution of avifauna within the coastal talukas of Sindhudurg District, Maharashtra”. The study recorded 296 species covering 74 families and 21 orders.

The Division of Conservation Ecology studied the dispersal patterns in the Edible-nest Swiftlet of Andaman Islands. They mapped the nests of Edible-nest Swiftlets in selected caves and recorded the species breeding biology through capturing and marking techniques. The Division also completed its study on the “Status, ecology, and conservation of Narcondam Hornbill, Narcondam Island”. The estimated density of Narcondam Hornbill was 121 ± 52 SD individuals/sq. km. Complete nest success was detected in 18 (86%) nests, while three (14%) nests depicted partial success. No observed nest had a complete breeding failure. A conservation plan for the species was formulated.

Updates on the conservation of the Andaman Serpent Eagle in the Andaman Islands: Phase – I reported a significant hunting pressure on the species, as more than 60% of the forest people were found to be hunting raptors to save their poultry and for meat consumption. "Identifying Indian cavity nesters most vulnerable to the loss of large trees" aimed to study the competitive relationships among the members of the cavity-nesting guild by artificial nest-box (58) monitoring on forest lands and institutional campuses. Results showed that most boxes were occupied by the Indian palm Squirrel (3 boxes), Common Myna (2 boxes), Honey Bee (2 boxes) and Spotted Owlet (1 box). This Division also started a 5 year pioneering study to assess the anthropogenic threats on large carnivore population in the Western Ghats part of Tamil Nadu. The study will address drivers of human-large carnivore conflict through understanding ecological and socio-environmental variables, human attitudes, perspectives, landscape features, spatio-temporal patterns of conflict/depredation, and capacity building of forest managers along the tiger and co-predator's distribution range.


Peregrine Falcon
(*Falco peregrinus*)

The Conservation Biology Division started the Small Cat project in Sanjay Gandhi National Park, Mumbai to study their distribution, threats, coexistence and diet pattern through molecular analysis of scats, camera-trapping and scat analysis. This Division completed its study on the taxonomic and conservation status of the Forest Owlet (Heteroglaux blewitti), a Critically Endangered species, endemic to Central India. Two new records of H. blewitti were obtained from Gujarat. The past climatic niche models suggested that the species was restricted to Central India since the Last Glacial Maxima, with a significant reduction in suitable habitat. To resolve the taxonomic ambiguity surrounding H. blewitti it was found that there was no case of hybridization between H. blewitti and Athene brama. Molecular based phylogenetic results showed that H. blewitti is nested within the Athene clade. The Division completed its study on the ecological species sorting in relation to habitat structure in the small cat guild of Eaglenest Wildlife Sanctuary, Arunachal Pradesh. Results from camera-trapping revealed that the Marbled Cat and Leopard Cat were both spatially and temporally separated. The long-tailed Marbled Cat was restricted to dense canopy forests and the medium-tailed Leopard Cat and Golden Cat were largely found in moderate canopy cover. Four distinct morphs of Golden Cat were found in an area of approximately 34 km^2. Dietary analysis of Leopard cat scats showed murid


Asian Fairy Bluebird
(*Irena puella*)


Falcon
(*Falco sp*)

rodents with Rattus andamenensis being the most common. Field work on the potential ecological impact of windmill farms on wildlife with special emphasis on the avifauna in Karnataka, has just been initiated. The study on the "ecology of elephant (*Elephas maximus*) in south-west Bengal", mapped and identified high conflict areas (hotspots) using existing data on human-elephant interactions. The majority of human causalities occurred during NTFP collection and agricultural activities by local people. A completed study on the spatio-temporal burrow use patterns by vertebrates in Keoladeo National Park, Bharatpur revealed that burrow systems were co-occupied by golden jackal, leaf-nosed bat, and Indian-rock python. Except for porcupines, other fauna occupied burrows were based on specific characteristics, wherein jackals occupied burrows with larger chambers, pythons occurred in smaller compact chambers and bats occupied burrows with fewer branches and openings.

The Landscape Ecology Division studied five selected endemic trees and their conservation strategies in the forests of Tamil Nadu. The study recorded the extended distribution of Wendlandia angustifolia, a woody shrub along river tributaries. The Division also conducted a rapid habitat assessment of Mangalavanam Bird Sanctuary, Kerala that revealed the ongoing management interventions such as construction of walkways inside the Sanctuary.

The Ecotoxicology Division studied the Polycyclic Aromatic Hydrocarbons (PAHs) contamination in Palikaranai wetland, Chennai taking fish as indicators of ecosystem health. One cycle of sample collection was completed and the processing of those samples are in progress. The Division completed the surveillance of waterfowl at Nalabana Bird Sanctuary, Chilika Lake, Odisha. Mortality of waterfowls was estimated at 1200 birds. Pathological investigations confirmed that the mortality of ducks was due to the outbreak of Fowl Cholera or Pasteurellosis caused by Pasteurella multocida. Northern Pintail had the highest load of heavy metals, while Common Pochard had the lowest. Females accumulated heavy metals higher than males.

The Avian Physiology Division completed the ecological baseline study for Palk Bay, Tamil Nadu. Water and sediment analysis did not reveal serious pollution levels. Salinity in the mangrove swamps was higher than the offshore locations. Perceptions of local inhabitants, mainly fishers from interviews conducted, showed apparent resource conflicts with different fishery techniques including aquaculture. This Division completed four projects: study on phthalates in the environment: development of an in vitro model for studying the impacts of

low levels on male reproduction, reproductive seasonality and sperm cryopreservation in the male tufted deer, the influence of cooling and thawing conditions and cryoprotectant concentration on frozen-thawed survival of White-naped Crane spermatozoa and development of a microfluidic gas-liquid interphase 3-D tissue explant culture chip for fertility preservation.

The Extension Division completed the documentation on the biodiversity of Sompeta wetland, Srikakulam District, Andhra Pradesh and developed biodiversity-mediated livelihood options for local communities.

The Wetland Ecology Division completed its baseline studies and the ecotoxicology of fishes, crabs and bivalves for Thane creek. Results showed that the creek had become shallower and narrower with increased levels of silt. Further they recorded varying concentrations of metals in the feathers of birds including mercury and arsenic. The metals studied were all above the National standards set for marine waters as per the Environment (Protection) Rules, 1986. The status of the creek from the toxicological point of view indicated harmful conditions for living forms. The Division also completed a brief documentation of wetlands in the forest areas of Maharashtra.

The Nature Education Division continued to inculcate love for nature and conservation among the younger generation through active field participation and awareness programs. The division conducted 23 'one day nature awareness programmes', released four brochures viz. Common Birds, Butterflies, Dragon flies, Trees and Shrubs of SACON campus, established a 1.8 km Nature Trail, conducted five field programmes including bird watching and nature competitions for school children.

There has been major progress in SACON's infrastructure and facilities. The Conservation Genetics Laboratory, under the Conservation Biology Division, was setup with various state-of-the-art instruments to conduct molecular analysis on contemporary biological samples (e.g. tissue, scat, blood, saliva, feathers). Dr. Amita Prasad, Additional Secretary, MoEFCC, inaugurated the Conservation Genetics Laboratory. For the first time ever, SACON held a five


Painted Bush Quail
(*Perdicula erythrorhyncha*)

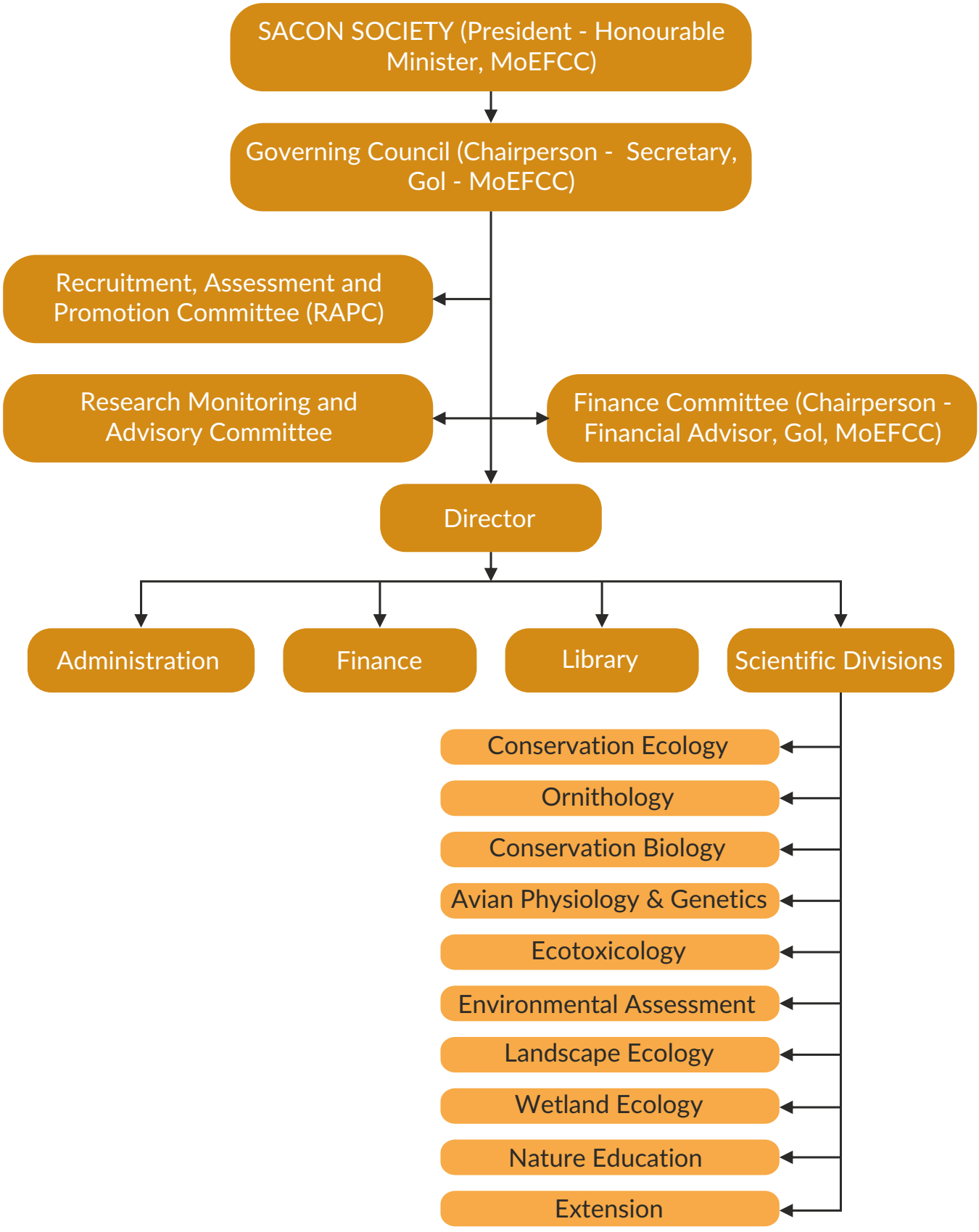

Great Hornbill
(*Buceros bicornis*)

day workshop on Conservation Genetics in June 2017. The Geographical Information System (GIS) and Remote Sensing Laboratory was established under the Landscape Ecology Division for developing and working on spatial and non-spatial data through a common database. SACON also established the National Ornithological Databank (NOD) Cell, a data-portal to maintain a large databank on Indian ornithology and natural history for research and outreach. NOD Cell was inaugurated by Shri. Ajay Narayan Jha, IAS, Secretary, MoEFCC, Govt. of India in the presence of Dr. T. Chandni, Scientist-G and Advisor, MoEFCC. The Division of Ecotoxicology held a training programme on "Instrumentation and Analytical Techniques" for 23 candidates from various disciplines. The MoEFCC sponsored a training program on "Monitoring and management of wetlands" for the mid-level forest officers from southern states of India. The officers from three southern states viz. Tamil Nadu, Telangana and Karnataka participated in this training program. The program was inaugurated by Dr. Rajeev K. Srivastava, IFS, Director, Tamil Nadu Forest Academy (TNFA), Coimbatore in the presence of Mr. Chandan Singh, Dy. Director, MoEFCC, Govt. of India, New Delhi and Dr. K. Sankar, Director SACON. The training program was enriched by eminent wetland scientists, policy and decision makers who also shared their expertise in wetland management.

SACON participated in the "Smart India HACKATHON-2017", a digital product building competition co-organised by AICTE, Ministry of Human Resource Development, MyGov, NIC and NASSCOM. SACON faculty envisaged 28 `Problem Statements' related to environment, wildlife and climate change. SACON scientists scrutinized the project proposals submitted and provided guidance, technical support and judgment for all MoEFCC projects during the Grand Finale. SACON organized a two-day workshop on 'Ecology and Conservation of Andaman & Nicobar Biodiversity' in Port Blair in November 2016. The workshop deliberated upon various aspects of ecology and conservation of Andaman & Nicobar biodiversity. Dr. Alok Saxena, Principal Chief Conservator of Forests, Andaman & Nicobar Islands inaugurated the workshop.


Blue-capped Rock Thrush
(*Monticola cinclorhynchus*)

ORGANOGRAM


SACON SOCIETY (President - Honourable Minister, MoEFCC)
Governing Council (Chairperson - Secretary, GoI - MoEFCC)
Recruitment, Assessment and Promotion Committee (RAPC)
Research Monitoring and Advisory Committee
Finance Committee (Chairperson - Financial Advisor, GoI, MoEFCC)
Director
Administration
Finance
Library
Scientific Divisions
Conservation Ecology
Ornithology
Conservation Biology
Avian Physiology & Genetics
Ecotoxicology
Environmental Assessment
Landscape Ecology
Wetland Ecology
Nature Education
Extension

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 28.

The 24th Annual General Meeting (AGM) of the SACON Society was held on 28th January 2016 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.

Members of the SACON Society

S. No.	Members	Status
1	Hon'ble Minister of Environment, Forest and Climate Change & President, Sálim Ali Centre for Ornithology and Natural History (SACON) Society, New Delhi	Ex-Officio
2	Chairman, Sálim Ali Centre for Ornithology and Natural History (GC) & Secretary to the Govt. of India, Ministry of Environment, Forest and Climate Change, New Delhi	Ex-Officio
3	Additional Secretary & Financial Advisor, Govt. of India, Ministry of Environment, Forest and Climate Change, New Delhi	Ex-Officio
4	Advisor, Govt. of India, Ministry of Environment, Forest and Climate Change, New Delhi	Ex-Officio
5	Principal Secretary to the Govt. of Tamil Nadu, Dept. of Environment and Forests, Chennai, Tamil Nadu	Ex-Officio
6	Director, Wildlife Institute of India, Dehra Dun	Ex-Officio
7	Vice Chancellor, Bharathiar University, Maruthamalai Road, Coimbatore, Tamil Nadu	Ex-Officio

S. No.	Members	Status
8	Director, Bombay Natural History Society, Hornbill House, Sálim Ali Chowk, Shaheed Bhagat Singh Road, Mumbai, Maharashtra	Ex-Officio
9	Chairperson, Centre for Ecological Sciences, Bengaluru, Karnataka	Ex-Officio
10	Dr. Erach Bharucha, Director, Bharati Vidyapeeth Deemed University, Pune, Maharashtra	Ex-Officio
11	Prof. Bonny Pilo, Professor of Zoology (Retd), University of Baroda, Vadodara, Gujarat	Ex-Officio
12	Dr. J. S. Samant, Professor (Retd.), Development Research Awareness and Action Institute (DEVRAAI), Kolhapur, Maharashtra	Ex-Officio
13	Prof. C. K. Varshney, Emeritus Professor, School of Environmental Sciences, Jawaharlal Nehru University, New Delhi	Ex-Officio
14	Dr. K. N. Ganeshaiah, University of Agricultural Sciences, Department of Genetics and Plant Breeding, G. K. V. K., Bengaluru, Karnataka	Ex-Officio
15	Prof. Anil K. Gupta, Professor, Indian Institute of Management, Ahmedabad, Gujarat	Ex-Officio
16	One representative from public sector enterprises/ banks	Vacant
17	Dr. K. Thiyagesan, Principal (Retd.), AVC College, Chidambaram, Tamil Nadu	Nominee
18	Dr. Rajah Jayapal, Principal Scientist, Division of Ornithology, Sálim Ali Centre for Ornithology and Natural History (SACON), Coimbatore, Tamil Nadu	Nominee
19	The Principal Secretary, Department of Environment and Forests, Govt. of Gujarat, Gandhinagar, Gujarat	Nominee

S. No.	Members	Status
20	The Principal Chief Conservator of Forests (Wildlife), Maharashtra Forest Department, Government of Maharashtra, Van Bhawan, Civil Lines, Nagpur, Maharashtra	Nominee
21	Director, Zoological Survey of India, Kolkata, West Bengal	Ex-Officio
22	Director, Silent Valley National Park, Mannarghat, Palghat, Kerala	Nominee
23	Director, Kaziranga National Park, Bokakhat District, Golaghat, Assam	Nominee
24	Dr. Mohan Ram, Professor (Retd.), Dept. of Botany, Delhi University	Nominee
25	Dr. S. Balachandran, Dy. Director, Bombay Natural History Society, Hornbill House, Sálim Ali Chowk, Shaheed Bhagat Singh Road, Mumbai, Maharashtra	Nominee
26	Mr. Ritesh Kumar, Conservation Programme Manager, Wetland International South Asia, Second Floor Defence Colony, New Delhi	Nominee
27	Dr. R. Sukumar, Professor, Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, Karnataka	Nominee
28	Dr. K. Sankar, Director, Sálim Ali Centre for Ornithology and Natural History (SACON), Coimbatore, Tamil Nadu	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 (MoEFCC). The GC has 15 members; Financial Advisor, MoEFCC, Advisor, MoEFCC or nominee, seven ex-officio members, seven 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:

Members of the Governing Council

S. No.	Members	Status
1	Secretary to the Government of India, or his/her nominee not below the rank of Additional Secretary. Ministry of Environment, Forest and Climate Change – Chairperson	Ex-Officio
2	Financial Advisor, MoEFCC, or his/her nominee from the IFD of the MoEFCC	Ex-Officio
3	Advisor, MoEFCC, dealing with the matters of SACON, or his/her nominee	Ex-Officio
4	Secretary, Department of Environment and Forests, Tamil Nadu	Ex-Officio
5	Director, Wildlife Institute of India (WII), Dehra Dun	Ex-Officio
6	Vice Chancellor, Bharathiar University, Coimbatore	Ex-Officio
7	The Chairperson, Centre for Ecological Sciences, Indian Institute of Science (IISc), Bengaluru	Ex-Officio
8	Dr. Girish Jathar, Scientist, Bombay Natural History Society (BNHS), Mumbai	Nominee
9	Dr. G. Maheswaran, Zoological Survey of India (ZSI), Kolkata	Nominee
10	Dr. Hilloljyoti Singha, Ecologist & Ornithologist, Silchar, Assam	Nominee
11	Dr. S. Subramanya, Professor, Seed Unit, University of Agricultural Sciences, Bengaluru	Nominee
12	Dr. Deepak Apte, Director, Bombay Natural History Society (BNHS), Mumbai	Nominee
13	Director, Indian Institute of Management (IIM), Trichy, Tamil Nadu	Nominee
14	Chairman Cum Managing Director, Nuclear Power Corporation, Mumbai	Nominee
15	Dr. K. Sankar, Director, Sálim Ali Centre for Ornithology and Natural History (SACON), Coimbatore, Tamil Nadu	Member Secretary

The 68th meeting of the Governing Council was held on 08th March 2017 at New Delhi.

Research, Monitoring and Advisory Committee (RMAC)

S. No.	Members	Status
1	Dr. Ramakrishna, (Formerly Director-Zoological Survey of India), No. 169, 4th Main, 2nd cross, ITI Layout, Mallathally, Bangalore – 560 056	Chairman
2	The Chief Wildlife Warden (WL), No: 1, Jeenis Road, Panagal Building, Saidapet, Chennai – 600 015	Ex-Officio
3	The Chief Wildlife Warden (WL), Wildlife Circle, Chatham, Port Blair, Andaman and Nicobar Islands – 744 102	Nominee
4	The Chief Wildlife Warden (WL), Govt. of Gujarat, Aranya Bhavan, Near Central Water Commission, Near CH-3 Circle, CH Rd, Sector 10A, Sector 10, Gandhinagar, Gujarat - 382 010	Nominee
5	The Dy. Inspector General of Forests (WL), Government of India, Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jorbagh Road, Aliganj, New Delhi – 110 003	Ex-Officio
6	Dr. S. Faizi, Ecologist, R2 Saundarya Apartments, Nandavanam, Trivandrum, Kerala – 605 209	Member
7	Dr. A. B. Shanbhag, (Head & Professor - Retd, Department of Zoology, Goa University), FF 4, Trigunatmica Apartments, Dasankoppa Circle, Haliyal Road, Saptapur, Dharward – 580 001 Karnataka	Member
8	Dr. V. Vijayakumar, Additional Director, Gujarat Institute of Desert Ecology, Post Box No: 83, Mundra Road, Bhuj (Kutch) - 371 001, Gujarat	Member
9	Prof. R. Geeta, Department of Botany, Delhi University (North Campus), Delhi – 110 007	Member
10	Dr. K. Gurumurthy, (Director – Retd, IFGTB) 62/4, Block – II, Leela Apartment, Ponnaiharajapuram, R S Puram, Coimbatore – 641 002	Member
11	Prof. S. K. Dutta, (Head - Retd., Department of Zoology, North Orissa University), Plot No: 1573/1; Udyogpuri, Post: Khandagiri, Bhubaneshwar – 751 030	Member
12	Mr. B. C. Choudhury (Faculty - Retd., Wildlife Institute of India), H. No: 7, Lane No: 7, D Block, Aman Vihar, Sahasradhara Road, Dehra Dun – 248 001	Member

S. No.	Members	Status
13	Dr. S. Muralidharan, Senior Principal Scientist, Division of Ecotoxicology, Sálim Ali Centre for Ornithology and Natural History (SACON), Coimbatore – 641 108	Nominee
14	Dr. Rajah Jayapal, Principal Scientist, Division of Ornithology, Sálim Ali Centre for Ornithology and Natural History (SACON), Coimbatore – 641 108	Nominee
15	Dr. K. Sankar, Director, Sálim Ali Centre for Ornithology and Natural History (SACON), Coimbatore – 641 108	Member Secretary

The 29th meeting of the Research, Monitoring and Advisory Committee was held on 26 May 2016 at SACON, Coimbatore.

Nilgiri Flycatcher
(*Eumyias albicaudatus*)

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 (4).

Scientific

Director	Dr. K. Sankar
Ornithology	Dr. Rajah Jayapal, Principal Scientist Dr. S. Babu, Scientist
Avian Physiology and Genetics	Dr. P. A. Azeez, Senior Principal Scientist – I Dr. R. P. Singh, Scientist
Conservation Ecology	Dr. S. Manchi Shirish, Senior Scientist Dr. T. Ramesh, 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, Librarian in-charge

Administration & Finance

Administrative Officer	Mr. R. Jayakumar
Finance Officer	Mr. Aneesh K. Abraham
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
Drivers	Mr. R. Ravi and Mr. P. Subramanian
Office Attendants	Mr. A. Devaraj and Mrs. V. Santhalakshmi
Site Engineer	Lt. Col. (Retd.) N. Sundararaj (on contract)
Computer Technician	Mr. A. Srinivasan (on contract)
Accounts Assistant	Mrs. B. Subha (on contract)

Emerald Dove
(*Chalcophaps indica*)

Ornithology

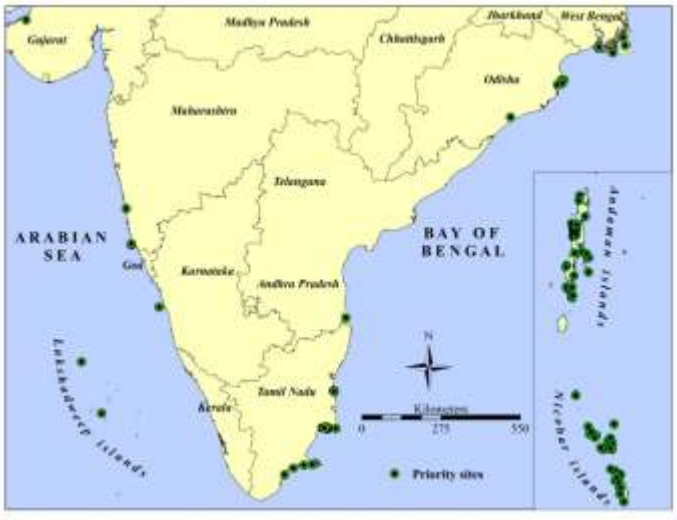
Mapping key nesting sites of coastal and marine birds for identification of Ecologically Sensitive Areas along Indian coasts

Principal Investigator	:	Dr. Rajah Jayapal
Co-PIs	:	Dr. S. Babu, Dr. P. A. Azeez, and Dr. Goldin Quadros
Research Fellows	:	Ms. Madhumita Panigrahi
Funding Agency	:	National Centre for Sustainable Coastal Management (NCSCM)
Collaborating Agencies	:	National Centre for Sustainable Coastal Management (NCSCM)
Project Duration	:	1 year
Status of the Project	:	Completed
Date of Commencement	:	20 July, 2015
Date of Completion	:	31 July, 2016
Annual Progress Report Period	:	April to July 2016
Total Budget	:	Rs. 4,25,000/-
Expenditure incurred during the period	:	Rs. 3,27,809/-

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.

Sooty Tern (*Onychoprion fuscatus*)

In total, 56 species of coastal and marine birds that are known to regularly nest along the Indian coasts were shortlisted and over 800 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. The nesting sites were further classified into multiple micro-habitat types as coastal heronries, mangroves and littoral forests, wood on seaboard, seashore and sandbanks, and coastal caves. Based on these criteria, a prioritization algorithm was developed to identify and shortlist the nesting sites for recommendation as potential ESAs.



Coastal Ecological Sensitive Areas

Based on the multiple criteria, 90 sites were shortlisted for consideration as Ecologically Sensitive Areas (ESAs) along the Indian coasts. Of these, 61 sites were finally recommended for inclusion in the network of ESAs as the remaining sites suffered from severe paucity of nesting data and other critical information. They include 42 sites from Andaman & Nicobar Islands, four each from Tamil Nadu and West Bengal, two each from Lakshadweep, Maharashtra, and Odisha, and one each from other coastal states. A majority of the prioritized sites were found to harbor significant nesting populations of species like White-bellied Sea Eagle, Nicobar Megapode, and Edible-nest Swiftlet. Using habitat-based algorithm in Google Earth Pro and 1:50,000 Survey of India toposheets, exact boundaries of the 61 prioritized sites were demarcated and shape files were overlaid with the master spatial database maintained at NCSCM.

Owl assemblage and occupancy in Andaman archipelago, India

Principle Investigator	:	Dr. S. Babu
Co-PI	:	Dr. H. N. Kumara
Research Fellows	:	Mr. S. Suresh Marimuthu
		Mr. N. Rajesh Kumar
Funding Agency	:	Science & Engineering Research Board
	:	Dept. of Science & Technology, GoI
Collaborating Agency (if any)	:	Nil
Duration of the project	:	3 years
Status of the project	:	Completed
Date of initiation & completion of the project		25.05.2013 to 18.12.2016
Annual Progress Report Period	:	2016-2017
Total Budget	:	Rs. 41,17,000/-
Expenditure incurred during the period	:	Rs. 8,80,041/-

We identified factors influencing the assemblage pattern of owls in offshore islands, and proportion of area occupied by endemic and threatened owls in north Andaman Island. Fixed radius point count method with three sampling protocols viz. listening to spontaneous calls, broadcasting of conspecific calls and spotlight searches were adapted to record the presence/absence of owls. At each census point, vegetation structure was assessed using Point Centered Quarter method. Site occupancy framework in spatial replicates was followed to identify covariates that influence detection probability and occupancy of owls in north Andaman. Four km^2 spatial grids were considered as individual sampling unit; however, alternative grids were sampled. In all selected grids, owl census was conducted, and sampling and site covariates were quantified.

Andaman Barn Owl (*Tyto deroepstorffi*)

Species richness and abundance of owls were relatively higher in natural forests (evergreen and deciduous) than in human-modified habitats (*agriculture fields and plantations*). In offshore Islands, Oriental Scops Owl was recorded in >70% of the Islands surveyed. Andaman Scops Owl and Andaman Hawk Owl were recorded in < 30% of the Islands. Andaman Barn Owl, Andaman Hawk Owl and Andaman Scops Owl were highly selective in habitat use. Hume's Hawk Owl and Oriental Scops Owl were recorded in all habitat types in the Andaman Islands and they are not facing any immediate threat to their population. The occupancy estimates revealed that mean tree GBH and coefficient of variance of elevation positively influenced the occupancy of Andaman Hawk Owl and mean canopy cover, coefficient of variance of understory cover and tree height influenced negatively. Mean inter-tree distance, canopy cover and understory cover positively influenced the occupancy of Andaman Scops Owl and proportion of crop fields influenced the occupancy negatively. Paddy fields showed negative influence on habitat use by Andaman Scops Owl in north Andaman.

Assessing the status and distribution of avifauna within the coastal talukas of Sindhudurg District, Maharashtra

Principle Investigator	:	Dr. S. Babu
Co-PI	:	Dr. Goldin Quadros
Research Fellows	:	Mr. G. Babu Rao Mr. V. Anoop Mr. Mayur Sarang Mr. Rajan Surve
Funding Agency	:	GOI-UNDP-GEF-Mangrove Cell, Mumbai
Collaborating Agency (if any)	:	Nil
Duration of the project	:	2 years
Status of the project	:	Completed
Date of initiation & completion of the project	:	10.09.2014 to 09.03.2017
Annual Progress Report Period	:	2016-2017
Total Budget	:	Rs. 28,18,800/-
Expenditure incurred during the period	:	Rs. 9,59,964/-

The project was undertaken to study the relationship between coastal birds and environmental variables with a focus to identify important areas for the conservation and sustainable utilization of coastal habitats. Seven estuaries were selected considering the length of the river, degree of anthropogenic pressure and spatial representation for quantifying the coastal birds and habitat parameters (water quality, sediment structure and benthos) in Sindhudurg District. Total count method was adopted to count birds. Each estuary was surveyed once in a month to document the spatial and temporal patterns in the distribution and abundance of birds. Standard protocols were followed for water, soil and benthos assessment. Nest site selection of White-bellied Sea Eagle was studied by surveying the entire Sindhudurg coasts.

A total of 296 species belonging to 74 families and 21 orders were collated from the coastal areas of Sindhudurg District. Among them, Great Knot (**Endangered**), Wolly-necked stork (Vulnerable) and fourteen other species (Near Threatened) were present, which are globally threatened. Bird species richness and abundance at Mochemad was relatively higher than other sites. Species richness was low during monsoon (May to August) and reached its peak from October onwards.

Greater Crested Tern (*Thalasseus bergii*)

Two peaks in species richness were observed, one in October and another in February and was regulated by onward and return of passage migrants during these months. Achara (H' = 2.97), Wadathar (H' = 2.84) and Niviti (H' = 2.78) had the highest species diversity among the seven sites. Species richness (22 species out of 26 species) and diversity (H' = 1.89) of small waders/shorebirds was higher in Mochemad. We counted 46 nests (encounter rate = 0.51 nests/km) with a maximum of 27 (58.7%) nests in Malvantaluka. More than 93% of nests were found on Casuarina equisetifolia (80.4%) and Sterculia foetida (13%) trees. A cluster of five to ten old grown Casuarina trees (girth class: 200-300 cm and 20-30 m height) from each patch of Casuarina plantations along the coast should be retained as nesting trees for the species.

Conservation Ecology

Black-hooded Oriole
(*Oriolus xanthornus*)

Understanding dispersal patterns in the monomorphic Edible-nest Swiftlet of Andaman Islands using biotechnological tools

Principle Investigator	:	Dr. Manchi Shirish S.
Co-PI	:	Dr. Ram Pratap Singh
Project Fellow	:	Mr. Prathamesh Gujarpadhye
Funding Agency	:	Department of Biotechnology, Government of India
Collaborating Agency (if any)	:	Nil
Duration of the project	:	3 years
Status of the project	:	Ongoing
Date of Initiation	:	04.01.2016
Date of Completion	:	03.01.2019
Annual Progress Report Period	:	April 2016 to March 2017
Total Budget	:	Rs. 45,78,200/-
Expenditure incurred during the period	:	Rs. 18,29,273/-

The study was designed with the objectives: 1) to understand the function of sex and colony size in dispersal (gross and natal) and natal philopatry in monomorphic edible-nest swiftlet at Baratang Island in North and Middle Andaman Islands, and 2) to examine the function of the inter-colonial distance and individuals' morphometry in its dispersal in the study area. In order to study the dispersal patterns of the study species the mark-recapture method was used. We selected 10% of the 120 caves with the populations of the Edible-nest Swiftlet to capture all the adults and chicks and marked those using Aluminum Z-rings. To determine the sex of each bird we collected blood samples from captured individuals. We also mapped each cave location using Global Positioning System to estimate the distance between caves. We visited the nests of edible-nest swiftlets in the selected caves on a daily basis to keep track of the breeding biology of the colony and the chicks' availability for marking.

Edible-nest Swiftlet (*Aerodramus fuciphagus*) flying towards its roosting cave after successful capture and marking

During the reporting period, we mapped all the 175 caves in the study area using handheld GPS and the software Q-GIS 2.18.1. We developed the distance matrix which will be used, once recapture of the individuals commenced, after the breeding season. During the nesting period, 256 adult birds were captured using mist nets from 12 selected caves and marked with Aluminum Z-ring. We also collected blood samples from all the captured individuals. The blood samples were preserved on the Insta DNA cards.

Status, ecology, and conservation of Narcondam Hornbill (*Aceros narcondami*) on Narcondam Island, India

Principle Investigator	:	Dr. Manchi Shirish S.
Funding Agency	:	Ministry of Environment, Forest and Climate Change, Government of India
Collaborating Agency (if any)	:	Nil
Duration of the project	:	18 months (Extended for 6 years and 4 months)
Status of the project	:	Completed
Date of Initiation	:	22.11.2010
Date of Completion	:	31.03.2017
Annual Progress Report Period	:	April 2016 to March 2017
Total Budget	:	Rs. 6,07,000/-
Expenditure incurred during the period	:	Rs. 79,200/-

A male Narcondam Hornbill

The aim of the study was to understand the status, biology and habitat requirements of Narcondam Hornbill for developing conservation measures/strategies. Since the species is restricted to the Narcondam Island in the north-eastern part of the Andaman Islands, the study area was confined to the single island. The isolated Narcondam Island spans 6.82 km^2 with tropical evergreen forest and bears a dormant volcano. The population survey using fixed width line transects revealed that the Narcondam Hornbill may be one of the most densely populated hornbill species in the world with an estimated density of 121 ± 52 SD birds/sq. km. The study of nest cavity and nest tree characters revealed that the species is selective in terms of the cavity height, nest tree GBH, height of the first branching and height of the nest tree. We observed nest success for 21 nests. Complete success was detected in 18 (86%) nests, while three (14%) nests depicted partial success. No observed nest had a complete breeding failure. The midden collection and analysis from 13 nests was conducted. The composition of food supplied at the nest by male in the midden varied significantly ($\chi^2 = 5.50$, df = 8, p = 0.70) over the years, when compared with Vijayan et al., (2000) and Vivek and Vijayan (2003). Since the Coast Guard did not give approval for travel of the research team during monsoon, the required fieldwork could not be conducted to collect data during the non-breeding season of the Narcondam Hornbill. The study has provided the current population status of the species and its conservation issues will be used to formulate the conservation plan for the endangered Narcondam Hornbill.

Conservation of the Andaman Serpent Eagle (*Spilornis elgini*) in the Andaman Islands: Phase – I

Principle Investigator	:	Dr. Manchi Shirish S.
Research fellow	:	Ms. Shivkumari Patel
Funding Agency	:	Raptor Research and Conservation Foundation, Mumbai
Duration of the project	:	2 years
Status of the project	:	Ongoing
Date of Initiation	:	29.12.2014
Date of Completion	:	30.06.2017
Annual Progress Report Period	:	April 2016 to March 2017
Total Budget	:	Rs. 11,56,500/-
Expenditure incurred during the period	:	Rs. 3,51,268/-

The project was initiated during December 2015 to address the following objectives: 1) Estimate the 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.


Andaman Serpent Eagle

To understand abundance and distribution of the ASE, we selected random cells for the survey by plotting 5x5 km grid on the islands with not more than 100 km^2 area in the Andaman Islands. We conducted the survey during 2015 and 2016 and laid 162 transects of various lengths (from 669 to 1040 m) depending upon the terrain, in the selected cells across the study area. The occupancy model was run for transect survey data using the software PRESENCE 10.9, to estimate abundance and distribution of the species. The habitat type and activity (perched or soaring) were recorded for each sighting. To identify potential threats to the study species in the Andaman Islands we did a snowball survey wherein we interviewed the forest dwellers. We conducted questionnaire survey to gather information on the hunting pressure on ASE from the local people in and around the study area.

The occupancy model depicted uniform distribution of ASE throughout the Andaman Islands. The detection probability estimate showed that the species was abundant with naïve occupancy (Ψ) = 0.83, and detection probability (p) = 0.08. The sighting locations showed that the species made use of all types of habitats available except plantation and agricultural land showing its dominance in the dense forest over open areas. We found two active nests of ASE in the mangrove forest that indicate the importance of the habitat for the species. Analysis of the questionnaire data revealed significant hunting pressure on the species, as more than 60% of the people interviewed were found to be hunting raptors to save their poultry and also for meat consumption.

Identifying Indian cavity nesters most vulnerable to the loss of large trees

Investigators	:	Dr. Manchi Shirish S. *Dr. Mark Stanback, Professor of Biology,* Davidson College, Dept. of Biology, Box 7040 Davidson, NC 28035-7040. USA.
Funding Agency	:	National Geographic Society, USA through Davidson College, Dept. of Biology, Box 7040 Davidson, NC 28035-7040, USA
Collaborating Agency (if any)	:	Davidson College, Dept. of Biology, Box 7040 Davidson, NC 28035-7040, USA
Duration of the project	:	2 years 6 months
Status of the project	:	Ongoing
Date of Initiation	:	22.12.2014
Date of Completion	:	30.06.2017
Annual Progress Report Period	:	April 2016 to March 2017
Total Budget	:	US$12,000
Expenditure incurred during the period	:	Rs. 1,35,900/-

The study was initiated with the objective to identify the cavity-nesting birds most vulnerable to the loss of large trees in India. The secondary cavity-nesting birds are dependent on the availability of older cavity-bearing trees. With an experimental manipulation, we aim to identify competitive relationships among the members of the cavity-nesting guild that determine species persistence.

Installing bird nest boxes in the Nilgiri Biosphere Nature Park

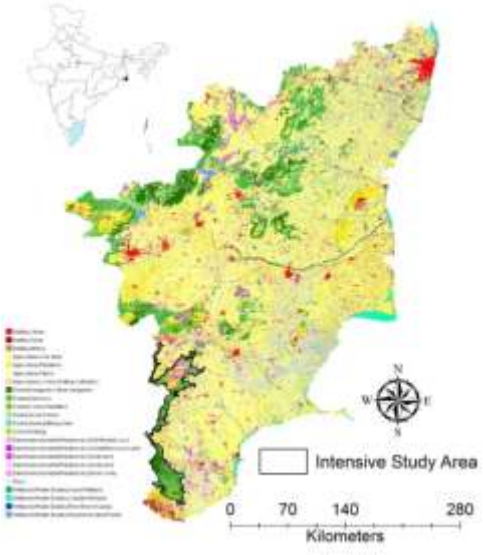
To impose competition, we placed nest boxes in different configurations (trios = 3 boxes, pairs = 2 boxes, and single boxes). According to the species available in the region the boxes were fabricated in two different sizes focusing on the large and medium body size cavity nesters. Keeping the territorial behavior of the bird species in mind, the boxes were installed in different combinations at 300 meter distance from each other. Originally the study was supposed to be carried out in different parts of the country depending on the availability of the place and permissions. Presently, the nest boxes are installed in different combinations (trios, pairs and single) in the Anaikatty region of Coimbatore, Tamil Nadu.

Because of the unavoidable reasons the study could be initiated only during May 2016. Totally 100 nest boxes were fabricated and installed. Of which, 58 boxes were installed before the onset of the breeding season of the cavity nesters in the Anaikatty region. All the boxes were installed between November 2016 and January 2017 in the premises of different institutions; SACON (22 boxes), Nilgiri Biodiversity Park (16 boxes), PSG College of Technology (10 boxes) and Karl Kubel Institute for Development and Education (10 boxes) in the Anaikatty region, close to the forest lands, for safety and security of the nest boxes. Of these 58 nest boxes, seven boxes were occupied by different species till March 2017. Most boxes were occupied by the Indian palm Squirrels (3 boxes), followed by Common Myna (2 boxes) and Honey Bee (2 boxes). One box with trio combination in SACON campus was occupied by the Spotted Owlet.

Assessing anthropogenic threats to large carnivore population in the Western Ghats part of Tamil Nadu

Principle Investigator	:	Dr. T. Ramesh
Funding Agency	:	*Science and Engineer*ing Research Board, Government of India
Duration of the project	:	5 years
Status of the project	:	Ongoing
Date of Initiation & Completion of the project	:	08.03.2017 to 07.03.2022
Annual Progress Report Period	:	08.03.2017 to 31.03.2017
Total Budget	:	Rs. 89,00,000/-
*Expenditure incurred during the per*iod	:	Rs. 96,000/-

Loss of habitat connectivity, human persecution, poaching and direct anthropogenic pressure has caused tiger (*Panthera tigris*), wild dog (*Cuon alpinus*) and striped hyena (*Hyaena hyaena*) to decline/disappear from many of their former ranges and their population is restricted to small and fragmented areas bounded by a growing human population. The fragmented Protected Areas (PAs) in tropical countries are the last refugia for many large predators, however they are sensitive to the effect of habitat degradation outside PAs. This has led to continuous conflicts between the local community and large carnivores mainly due to livestock depredation. Therefore conservation of large carnivores is mainly dependent on surrounding habitats of core areas, herein successful conservation will depend on how we resolve human carnivore conflicts around core habitats. The Western Ghats part of Tamil Nadu (WGPTN) landscape holds relatively high density of last remaining largest populations of tiger and other co-predators, and the world's most important conservation landscape. It therefore represents a significant potential source habitat for these species to repopulate to other landscapes and acts as a source population for neighbouring areas. The current research addresses main drivers of human-large carnivore conflict through understanding ecological and socio-environmental variables, human attitudes and perspectives, landscape features, spatio-temporal patterns of conflict/depredation likelihood in carnivores, and capacity building for forest managers along the tiger and co-predators distribution range in WGPTN. Narrative account of conflict information will be collected through structured questionnaire surveys. Therefore this research would provide a comprehensive understanding of human-wildlife conflicts for formulating management plans to reduce human-large carnivore conflicts. The project started recently (March 2017) and the research permission has been requested from Tamil Nadu State Forest Department. Meanwhile necessary preparatory work for the project has been initiated through literature reviews, purchase of equipment for the field work and engaging a research fellow.



Conservation Biology

Coppersmith Barbet
(*Megalaima haemacephala*)

Survey of small cats in Sanjay Gandhi National Park, Mumbai

Principle Investigator	:	Dr. Shomita Mukherjee
Co-PIs	:	Mr. Nayan Khanolkar and Dr. P. V. Karunakaran
Funding Agency	:	Maharashtra Forest Department
Collaborating Agency (if any)	:	Maharashtra Forest Department
Duration of the project	:	18 months
Status of the project	:	Ongoing
Date of Initiation & Completion of the project	:	29.03.2017 to 28.09.2018
Annual Progress Report Period	:	April 2016 to March 2017
Total Budget	:	Rs. 7,72,012/-
Expenditure incurred during the period	:	Nil

Few metropolises in India can boast of a Protected Area in the heart of the city. Mumbai's Sanjay Gandhi National Park (SGNP) with an area of 104 km^2 is popularly referred to as the city's lungs. Apart from the recreational aspects of the forest to the city's denizens there is significant biodiversity value attached to it. It's prized species is the leopard, which unfortunately also receives considerable negative coverage due to sporadic but serious conflict with neighbouring human communities. This highlights the threats that the Park faces from the burgeoning metropolis and the development activities that go along with it. However, unknown to most, the Park is also home to at least two species of small cats, the jungle cat (an open habitat specialist) and rusty spotted cat (the smallest cat in the world). Apart from these, the leopard cat is also expected to occur here since it occurs across the Western Ghats. Not much is known about the distribution and habitat requirements of these small cats but studies indicate that they provide important ecosystem services due to their strong dependence on rodents as prey. The paucity of knowledge on their habitat requirements and threats impedes decision-making and strategising their conservation over a long period. Some of the questions that would provide very important answers from a managerial perspective are: How common are they? Where do they occur? What do they eat? Do their populations require management interventions such as captive breeding?

The aim of the project is to survey small cats of SGNP and surrounding areas to answer questions regarding their distributions, threats, coexistence and diet. This will be done through molecular analysis of scats for species identities, camera-trapping and scat analysis for diet estimations.

Determining the taxonomic and conservation status of the Forest Owlet (*Heteroglaux blewitti)*

Principle Investigator	:	Dr. Shomita Mukherjee
Co-PIs	:	Dr. V. V. Robin and Dr. Prachi Mehta
Research fellows	:	Mr. Pankaj Koparde
Funding Agency	:	Department of Biotechnology, Government of India
Collaborating Agency (if any)	:	National Centre for Biological Sciences, Bengaluru
Duration of the project	:	3 years and 3 months
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	15.04.2013 to 14.07.2016
Annual Progress Report Period	:	April 2016-March 2017
Total Budget	:	Rs. 30,52,000/-
Expenditure incurred during the period	:	Rs. 1,91,432/-

The Forest Owlet (*Heteroglaux blewitti*), is a Critically Endangered species, endemic to Central India. Studies on its phylogeny, population connectivity, and potential hybridization with Spotted Owlet (*Athene brama*) are of utmost importance to realize its conservation needs. The study addressed the following objectives: 1) To identify genetically unique populations of H. blewitii through a phylogeographic study, 2) To compare molecular based phylogeny to current taxonomy and 3) To resolve the taxonomic ambiguity surrounding H. blewitti with respect to possible hybrid individuals in the populations.

Due to time constraints and delay in obtaining permits from some Protected Areas, the first objective could not be addressed as planned. However, the contemporary and past niche of the species were modelled and tested in field. Two new records of H. blewitti were obtained from Gujarat. The past climatic niche models suggest that the species has been restricted to Central India since the Last Glacial Maxima, with a significant reduction in suitable habitat since then. For the second objective, two mitochondrial and four nuclear genes were sequenced, from moulted feathers of H. blewitti, A. brama and Glaucidium radiatum, generating around 4100 bp data. Results showed that H. blewitti is nested within the Athene clade, evolutionary distinct and with a possible African ancestry. To validate the hybridization issue, gene sequences of A. brama and H. blewitti were compared. No case of hybridization between H. blewitti and A. brama was detected. It is recommended to sample areas of highly suitable habitat, as predicted by the niche model, to detect the species across its range. To further resolve the phylogenetic position of H. blewitti, and to understand the functional connectivity of H. blewitti populations, a population genetic approach to devise population level conservation strategies to conserve the species is recommended.

Ecological species sorting in relation to habitat structure in the small cat guild of Eaglenest Wildlife Sanctuary, Arunachal Pradesh

Principle Investigator	:	Dr. Shomita Mukherjee
Co-PIs	:	Dr. Ramana Athreya and Dr. P. V. Karunakaran
Research fellows	:	Mr. Prafull Choudhury
Funding Agency	:	Department of Science and Technology, Government of India
Collaborating Agency (if any)	:	Indian Institute of Science Education and Research, Pune.
Duration of the project	:	3 years
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	25.11.2013 to 24.11.2016
Annual Progress Report Period	:	April 2016-March 2017
Total Budget	:	Rs. 48,08,000/-
Expenditure incurred during the period	:	Rs. 10,03,269/-

Cat morphology could indicate habitat associations with long tails suggesting arboreality and short tails, an adaptation to open habitats. The study explored the potential mechanisms of coexistence in sympatric felids (*spatio-temporal patterns and diet*) and compared conventional techniques for surveying small carnivores. The study area encompassed Eaglenest Wildlife Sanctuary (EWS) and the Bugun Community Forests (BCF). Thirty camera-traps were deployed in various placement configurations and 248 scats, assigned to Leopard Cat through molecular analysis, were analysed for diet. Canopy cover was measured around each camera-trap location, along the road and various points inside the forest.

Asiatic Golden Cat camera-trapped in EWS

Results suggested that morphological (and hence spatial) and temporal variation among the felids in EWS and BCF enable coexistence. The two felids most similar in body size (Marbled Cat and Leopard Cat) were both spatially and temporally separated. The long-tailed Marbled Cat was restricted to dense canopy forests and the medium-tailed Leopard Cat and Golden Cat were largely found in moderate canopy cover. Four distinct morphs of Golden Cat were found in an area of approximately 34 km^2.

Clouded Leopard camera- trapped in EWS

The diet of Leopard Cat consisted primarily of murid rodents with Rattus andamenensis being the most common species in its diet, both inside and outside the Protected Area.

Results showed that camera-trapping is a more efficient method to determine felid presence and habitat use but scats could be used to support this information as well as provide information on diet. In this study, the area from Sundarview to Bompu was estimated to be the richest in cat diversity.

Recommendations include, a larger area to be covered away from the road, in future studies in EWS, placement of camera-traps and search for scats on large tree branches for arboreal felids, long-term camera-trap monitoring for estimating breeding seasons of felids and a study for the potential explanation for the many morphs of Golden Cat.

A comprehensive study of potential ecological impact of windmill farms on wildlife with special emphasis on the avifauna in Karnataka

Principle Investigator	:	Dr. H. N. Kumara
Co-PI	:	Dr. S. Babu
Research fellows	:	Ms. Malyasri Bhattacharya, Mr. Mahesh D. Bilaskar, Mr. Harif Parengal and Mr. Tamiliniyan
Funding Agency	:	Karnataka Forest Department, Renewable Energy Development Limited, National Institute of Wind Energy
Collaborating Agency (if any)	:	Nil
Duration of the project	:	1 year and 6 months
Status of the project	:	Ongoing
Date of Initiation & Completion of the project	:	May 2016 - October 2017
Annual Progress Report Period	:	April 2016 – March 2017
Total Budget	:	Rs. 39,07,000/-
Expenditure incurred during the period	:	Rs. 18,00,000/-

Windmills cause three major potential risks to animals i.e. (1) direct loss of habitat through construction of wind farms and their associated infrastructures, (2) displacement of birds in response to the construction of wind farms, and (3) collision or interaction with rotor blades and other structures leading to death or injuries to the animals. The state of Karnataka has a high potential for wind farms and many wind farms have already been established, however, their impact on the wild animals is not known. Thus, the study aims to document composition and collision rate of animals especially the birds, bats, primates and other arboreal species in various control and wind farm sites of Karnataka state. The existing and proposed wind farm sites are located in Belgaum, Gadag, Davanagere, Bellary, Koppal, Chitradurga, Shimoga, Bhadravathi, Hassan and Tumkur Districts of Karnataka state. Considering the ecological sensitivity and density of wind farms, we selected Chitradurga and Gadag Districts for intensive sampling. The general feature, vulnerability to wildlife and mapping of the wind farm were undertaken in all other Districts. The field work was initiated in the month of August 2016, and the study is in progress. The study at Chitradurga and Gadag showed very less bird collision rate to windmills, yet it is not conclusive since the data collected is only for four months. The species richness of birds at the wind turbine site is relatively lower than the control sites at Chitradurga. However, the species richness is more in turbine sites than the control sites of Gadag District. In spite of alteration, few remnant patches around the turbine site at Gadag support a good diversity of birds.

Ecology of elephant (*Elephas maximus*) in south-west Bengal including population dynamics, migratory pattern, feeding habits and human-elephant conflict

Principle Investigator	:	Dr. H. N. Kumara
Co-PI	:	Dr. P. A. Azeez
Research fellows	:	Ms. Aakriti Singh
Funding Agency	:	West Bengal Forest and Biodiversity Conservation Society
Collaborating Agency (if any)	:	Nil
Duration of the project	:	3 years
Status of the project	:	Ongoing
Date of Initiation & Completion of the project	:	April 2016 – March 2019
Annual Progress Report Period	:	April 2016 – March 2017
Total Budget	:	Rs. 34,56,000/-
Expenditure incurred during the period	:	Rs. 5,00,000/-

Managing human–wildlife conflict is one of the greatest challenges for conservation of large mammals in India. The elephant is one of the most conflict-prone wildlife species, causing large-scale damage to crops and human lives. Human–elephant conflict refers to a range of direct and indirect interactions between human and elephants that potentially harm both. Today the ultimate challenge to conservationists all over India appears to be the reduction of the economic losses and loss of human lives while living with elephants and, at the same time, conserving viable populations of elephants. In south-west Bengal, the enormity of this problem is a distinct situation. The prolonged stay of migratory Dalma herds (elephants from Dalma Wildlife Sanctuary in Jharkhand) and resident elephants has become a growing concern due to economic losses, human and elephant deaths. The current study aims to understand population status and characteristics, movement pattern and human-elephant conflict in south-west Bengal. Maps for the specific study sites were prepared for different forest divisions. Mapping and identifying high conflict areas (hotspots) was done using the existing data on human-elephant interaction for a period of seven years from 2010 to 2016. Five accident prone zones on railway tracks in Panchet division were identified that include tracks between Bishnupur and Mynapur, around Tribanka Bridge in Basudebpur, four other zones identified are on the Bishnupur- Khargpur railway track i.e. Ghugumura railway crossing, Dhabani railway crossing (two zones) and Nachanjam railway crossing. We have explored the reasons for 64 human deaths in Panchet (18), Rupnarayan (15) and Midnapore (31) forest divisions. Our findings revealed that the majority of human causalities occurred during the NTFP collection and agricultural activities by local people.

A male Asian elephant (*Elephas maximus*) on the highway

Spatio-temporal burrow use patterns by vertebrates in Keoladeo National Park, Bharatpur, Rajasthan, India

Principle Investigator	:	Dr. H. N. Kumara, Dr. S. Bhupathy (Late)
Co-PI	:	Dr. Shirish Manchi S
Research fellows	:	Ms. Aditi Mukherjee
Funding Agency	:	Dept. of Science and Technology, Science and Engineering Research Board (DST-SERB), GoI
Collaborating Agency (if any)	:	Nil
Duration of the project	:	3 years and 6 months
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	June 2013 – December 2016
Annual Progress Report Period	:	April 2016 – March 2017
Total Budget	:	Rs. 42,61,000/-
Expenditure incurred during the period	:	Rs. 40,99,000/-

The study was conducted in Keoladeo National Park, Bharatpur, Rajasthan with the following objectives: 1. Determine burrow-dwelling animal assemblage in terms of species richness and abundance; 2. Understand the spatiotemporal factors influencing their composition and activity, especially emergence and retreat into their burrow.

Indian Rock Python (*Python molurus*) on the way to basking

The study area was gridded (25 ha) and systematically sampled for burrow locations. Upon locating the burrows, information on external and internal burrow characteristics, habitat variables including proximity of burrows to water source and boundary, vegetation parameters, soil type, and elevation were recorded. To assess the animal assemblage and activity pattern, camera trapping and burrow video camera were used. Photographs provided information on date and time of the picture taken, which was later used to record the daily activity pattern. The data was tested for normality and appropriate parametric or nonparametric statistics was employed using SPSS, Oriana (circular statistics) and Program PRESENCE. A total of 47 burrow systems were located. Indian-crested porcupine was the primary burrower in the study area. The porcupine was found throughout the terrestrial area of the park, however, percent water cover, distance from the park boundary surrounded by agricultural fields and elevation of the landscape determined the selection of burrowing site. Burrow systems were co-occupied by golden jackal, leaf-nosed bat, and Indian-rock python. Except for porcupines, other fauna occupied burrows were based on specific characteristics, wherein jackals occupied burrows with larger chambers, pythons occurred in smaller compact chambers and bats occupied burrows with fewer branches and openings. Occupancy of jackal was positively correlated and python was negatively correlated with mean chamber height. Bats showed a negative correlation with the number of branches and burrow openings.

Adult Indian Crested Porcupine (*Hystrix indica*) with their young ones

Landscape Ecology

Blue-capped Rock Thrush
(*Monticola cinclorhyncha*)

Ecological investigations on five selected endemic trees and their conservation strategies in the forests of Tamil Nadu, India

Principle Investigators	:	Dr. Chellam Muthumperumal and Dr. P. Balasubramanian
Funding Agency	:	*Science and Engineer*ing Research Board (SERB), New Delhi
Collaborating Agency (if any)	:	Nil
Duration of the project	:	3 years
Status of the project	:	Ongoing
Date of initiation & completion of the project	:	2nd May 2016 – 1st May 2019
Annual progress report period	:	May 2016 - March 2017
Total Budget	:	Rs. 32,90,000/-
Expenditure incurred during the period	:	Rs. 10,59,500/-

The angiosperm flora of India is characterized by high endemism. An endemic species grows naturally in a single geographic area and the distribution of such species could be either narrow or relatively large. The study aims to assess the population status of selected endemic tree species, study their phenology, dispersal mechanism and document the utilization, trade value, measure the threats and develop suitable conservation measures.

Mundanthurai Tiger Reserve

Three areas of high plant endemism, namely Kalakkad-Mundanthurai Tiger Reserve (KMTR), Kanyakumari Wildlife Sanctuary and Nilgiri South Division in Tamil Nadu part of Western Ghats were the identified study areas. During the reporting period, field work was initiated in Mundanthurai Range (08°31'N-08°48'N and 77°10'E - 77°21'E) of Kalakkad-Mundanthurai Tiger Reserve.

Among the five endemic tree species proposed in the study, Wendlandia angustifolia Wight ex Hook. f. (*Rubiaceae*) was selected to assess the extended distribution range. W. angustifolia was first collected by Wight from Courtallum and described by Hook. f. in 1880. In 1917, this species was collected by Rangachari from Kannikatti in KMTR and it was rediscovered after 81 years in Inchikuzhi, KMTR. Since there was no quantified data on the distribution of the species, it was categorized as extinct by IUCN. A total of 50 plots measuring 0.1 ha (31.7 m × 31.7 m quadrat) were laid to enumerate the endemic tree species of Thamirabarani river basin.

Wendlandia angustifolia Wight ex Hook.f.

W. angustifolia is a woody shrub found along the river banks and river beds in low and medium elevation riparian forests. The study recorded the extended distribution of this species in different tributaries of river Thamirabarani which included Servalar and Manimuthar. In the 5 ha area sampled, a total of 688 individuals of W. angustifolia were recorded. The classification of different height categories of 688 individuals comprised the following; 8.43% (1-10 cm), 77.32% (11-100 cm), 12.79% (101-300 cm) and 1.45% (>300 cm). Individuals measuring >11 cm were considered as adults. The species attains reasonable girth when it grows in river banks, whereas it is short-statured and shrubby in river beds. It produced new leaves in December, flower buds in January and was found in full bloom during February-March.

Habitat assessment of Mangalavanam Bird Sanctuary

Principal Investigator	:	Dr. P. V. Karunakaran
Co-PIs	:	Dr. Goldin Quadros and Dr. S. Babu
Research fellow	:	Mr. Kuldeep J. Mhatre
Collaborating Agency	:	Nil
Duration of the project	:	3 months
Funding source	:	Forest & Wildlife Department, Kerala
Date of initiation	:	March 2017
Date of completion	:	May 2017
Annual Progress Report Period	:	March 2017
Total Budget	:	Rs. 75,000/-
Expenditure incurred during the period	:	Rs. 25,000/-

The office of the Assistant Conservator of Forests, Nature Study Centre, Kalady under the Kerala Forest and Wildlife Department requested SACON to carry out a rapid habitat assessment of Mangalavanam Bird Sanctuary (MBS). The Sanctuary (MBS) with an area of 2.74 ha of wetland with mangrove vegetation is an excellent habitat for many resident and migratory birds. Geographically, it is close to the sea level.

Bund across the outlet of the Protected Area

It has a flat topography and it is located at 9°59' 13" North and 76°16' 26" East. MBS is in close proximity to the Vembanad lake one of the Ramsar sites in the State, SACON, during the year 2014-15 conducted an assessment and suggested certain management interventions for improving the habitat quality of the Sanctuary. The PA Management implemented some of the recommendations and requested us to conduct an assessment on the impact of interventions. Since it is a follow-up of the earlier study, we included the same components and adopted similar methods for the assessment which are as follows (a) examine the physical and environmental (water and sediment) aspects of the Sanctuary and (b) collect information on the management interventions and its impact. Accordingly, three components were included in the assessment viz., (i) physical and chemical properties of water and sediment, (ii) vegetation profile and (iii) the bird population with special reference to wetland habitat.

A view of Mangalavanam Bird Sanctuary

The primary data collection was carried out for the environmental parameters such as water and sediments, and on birds secondary information (both published and unpublished) along with primary data were used. Regarding vegetation profile, species list (mangrove and non-mangrove) was prepared and observations on vegetation profile were recorded. The ongoing management interventions such as construction of walkway inside the Sanctuary and a small dyke to impound water were also observed for its possible impact on the ecosystem. The laboratory analysis for the estimation of physico-chemical properties of the collected water and sediment sample is underway.

Ecotoxicology

Red Junglefowl
(*Gallus gallus*)

Polycyclic Aromatic Hydrocarbons (PAHs) contamination in Palikaranai wetland, Chennai; fish as an indicator

Principal Investigator	:	Dr. S. Muralidharan
Research Fellow	:	Ms. Mythreyi Deverajan
Funding Source	:	DST Inspire Fellowship
Collaborating Agency	:	Nil
Duration of the project	:	5 years
Status of the project	:	Ongoing
Date of Commencement	:	20th February 2015
Date of completion	:	19th February 2020
Annual Progress Report Period	:	April 2016 to March 2017
Total Budget	:	Rs. 19,00,000/-
Expenditure incurred during the period	:	Rs. 3,84,073/-

Development of human activities has always been closely associated with different water resources but, unfortunately anthropogenic activity has often resulted in chemical contamination of these resources. Pallikaranai is a wetland in south Chennai which has been providing a suitable habitat for many organisms particularly waders, fishes and amphibians. But this also happens to be the drain basin of waste for the entire south Chennai. Impact of urban waste on the organisms inhabiting this wetland is pertinent. Of all the contaminants, PAHs are ubiquitous and are persistent organic pollutants of the aquatic environment. They are also known for their carcinogenic and teratogenic properties. Their hydrophobic character and low biodegradability cause accumulation in organisms. Hence a study has been initiated with the following objectives: 1) Assess the PAH residues and document the variation in magnitude of contamination in selected species of fishes and sediments in the Pallikaranai wetland, 2) assess the suitability of fishes for human consumption, and 3) evaluate the genetic impacts caused in fishes and try to correlate with PAH.

Indiscriminate dumping of toxic waste on the banks of Pallikaranai Wetlands

Samples of fishes are being collected with the help of local fishermen adopting suitable methods based on species to be caught and also taking habitat into consideration. Method prescribed by Larry and Capel (1994) was followed for sediment sample collection. QuECheRS method adopted by João Ramalhosa et al., (2009) is followed for extraction of PAHs. HPLC fitted with fluorescence is used for analysis of samples. During the period under report, research permit to collect fish and sediment samples from Pallikaranai Reserved Forest has been obtained from Tamil Nadu Forest Department. One cycle of sample collection (Jan – March 2017) has been completed and the processing of those samples are in progress.

Surveillance of waterfowl at Nalabana Bird Sanctuary, Chilika Lake, Odisha

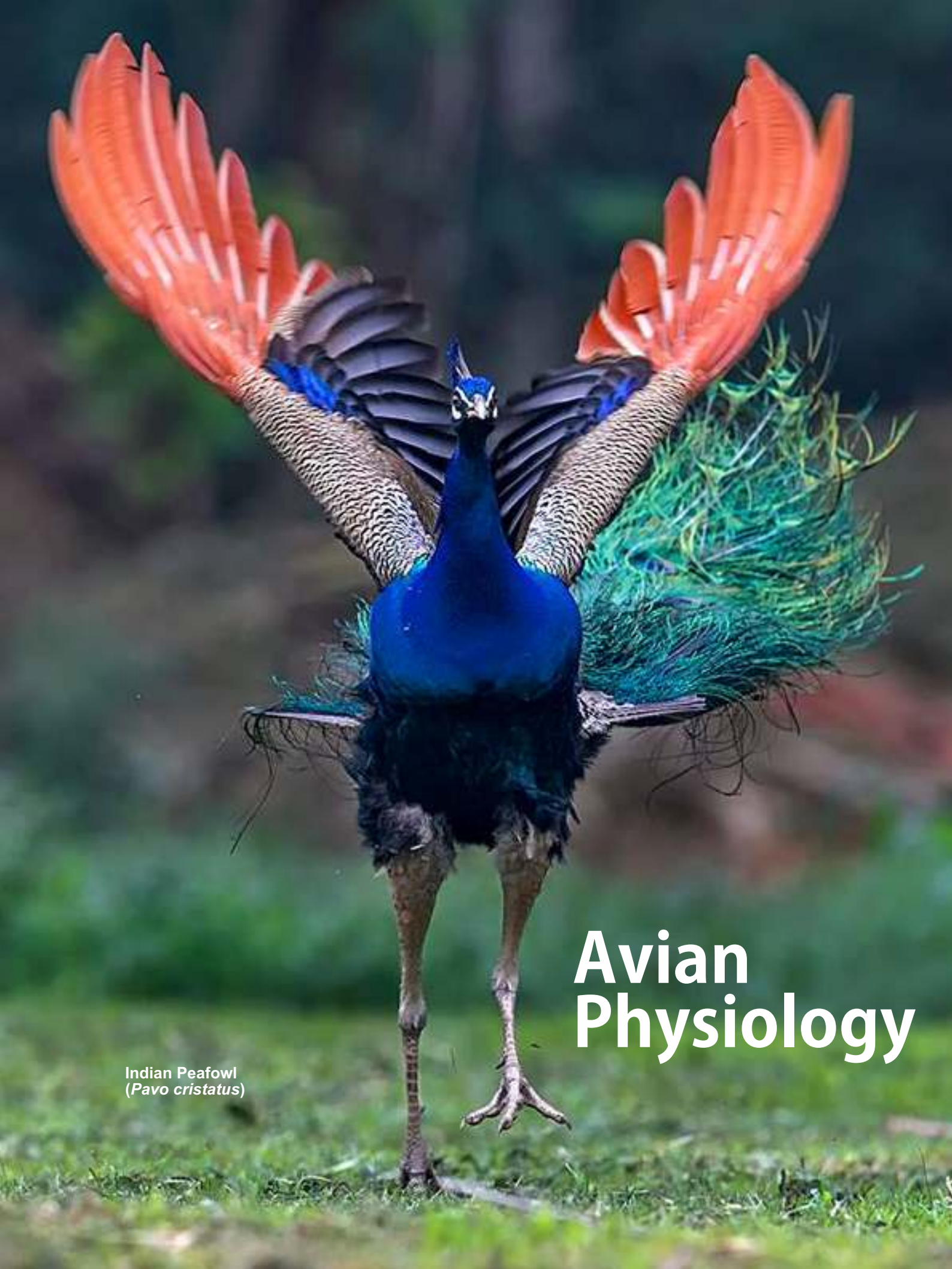
Principal Investigator	:	Dr. S. Muralidharan
Funding Source	:	MoEFCC, Govt. of India
Collaborating Agency	:	Nil
Status of the project	:	Completed. Report Submitted (July 2016)
Date of Commencement	:	March 2009
Date of Completion	:	July 2016
Annual Progress Report Period	:	April 2016 to March 2017
Total Budget	:	Rs. 7,08,200/-
Expenditure incurred during the project period	:	Rs. 7,52,828/-

Hundreds of migratory ducks died in Nalabana Bird Sanctuary, Chilika Lake. As mortality of birds continued, it was imperative to look at the possible role of diseases. Between December and March 2010, mortality of waterfowl was estimated at 1200 birds involving Northern Pintail, Northern Shoveler, Common Pochard, Eurasian Wigeon, Ruddy Shelduck, Gadwall, Tufted Duck and Garganey.

Birds showed clinical signs, such as inability to fly, swim, or walk, mucus discharge from the beak, flaccid paralysis of head and neck, and greenish diarrhea. Pathological investigations confirmed that the mortality of ducks was due to the outbreak of Fowl Cholera or Pasteurellosis caused by Pasteurella multocida. As carcass infected with Pasteurella multocida can spread the disease, incineration is the best option. Control strategy would warrant regular surveillance. In the context of increasing incidences of avian influenza, recognition of avian pasteurellosis is of great importance for differential diagnosis with avian influenza.

A flock of waterfowl at Nalabana Bird Sanctuary

Even though Fowl Cholera was confirmed, selected heavy metals (Cu, Cr, Cd and Pb) in dead birds were measured as phase II of the project to know the background levels. Data were compiled by species, organ and sex of the birds. Liver had the highest concentration of all the metals and muscle the least. Northern Pintail (0.82 µg/g) had highest load of all metals, while Common Pochard (0.08 µg/g) measured the lowest. Females accumulated all the metals higher than males except Pb concentration; none of the metals studied were high enough to have killed any of the birds. In order to evaluate any instance of metal poisoning in birds, “normal” levels for the species involved must be known and the abnormal levels which tend to harm or have no apparent harmful effects must also be recognized. Regular surveillance is advised.



Avian Physiology

Indian Peafowl
(*Pavo cristatus*)

Ecological baseline study for Palk Bay

Principal Investigator	:	Dr. P. A. Azeez
Co-PIs	:	Dr. Goldin Quadros, Dr. Mahendiran Mylswamy, Dr. Shirish Manchi S.
Research fellows	:	Ms. Akshaya M. Mane, Mr. K. A. Nishadh, Mr. V. J. Jins, and Ms. M. P. Swathi
Funding Agency	:	GIZ, Indo-German Biodiversity Program, and Sustainable Management of Existing and Potential Coastal Marine Protected Areas in India (CMPA)
Collaborating Agency (if any)	:	M/s Omkar Foundation, Pattukottai
Duration of the project	:	1 year
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	November 2015 to November 2016
Annual Progress Report Period	:	2016-17
Total Budget	:	Rs. 15,72,525/-
Expenditure incurred during the period	:	Rs. 15,22,853/-

The objective of this study was to conduct a rapid ecological baseline survey of Palk Bay (off the Ramanathapuram coast), Tamil Nadu. The study explored water and sediment quality, evaluated habitats (*mangroves*, *seagrass and corals*), and issues related to aquaculture farms and their interactions with the local fishers. Rapid field surveys were conducted along the coast (126 km). In total 269 grids (1 km x 1 km) were examined covering 800 m seawards and 200 m landwards from the high tide line.

From the 392 species recorded, one floral endemic was recorded. Mangrove species were found in fragmented patches, with minor natural growth. During the survey, 7405 birds (130 species, 46 families) were recorded. Six lizards, two snakes and one turtle species were recorded. Insects (27 species) and arachnids (5 species) were recorded in the mangroves. Benthos was dominated by gastropods (41 species) followed by bivalves (15 species) and polychaetes. Water and sediment analysis did not reveal serious pollution levels. In some locations, oil and grease were high, due to local boating activities. Sediment was mainly sandy and at locations clayey and silty. Organic carbon, attributed to factors including the abiogenic inputs, varied between 1.37% and 8.11%. Salinity in the mangrove swamps was higher than the offshore locations.

To elicit perceptions of local inhabitants, mainly fishers, we interviewed randomly selected people using a questionnaire with open and close-ended questions. Large proportions of the respondents fell much below the poverty line. The changes in fishing crafts, fishing techniques, threats to their occupation, and about the sea in general including ecological and meteorological features and water flow patterns were some of the issues brought out by the respondents during the interactions. They highlighted that some common species are disappearing in different habitats. The results showed apparent resource conflicts with different fishery techniques including aquaculture. Traditional fishing communities were in precarious and disadvantageous position due to mechanized fishing gears and aquaculture. The traditional practice of resource sharing is under pressure from trawlers.

Phthalates in the environment: Development of an in vitro model for studying the impacts of low levels on male reproduction

Principal Investigator	:	Dr. Ram Pratap Singh
Co-PI	:	Dr. Budhan Pukazhenthi, Smithsonian Conservation Biology Institute, USA
Funding Agency	:	United States-Indian Educational Foundation
Collaborating Agency (if any)	:	Smithsonian Conservation Biology Institute, USA
Duration of the project	:	2 years
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	01.09.2014 to 31.08.2016
Annual Progress Report Period	:	NA
Expenditure incurred during the period	:	NA

Complete spermatogenesis has been achieved in vitro in mouse testicular explants with resulting sperm used to produce pups after ICSI and ET. Earlier studies in our laboratory demonstrated significant apoptosis in vitro when lamb testicular pieces were cultured under conditions described for the mouse. In this project, we evaluated the influence of sphingosine-1-phosphate (S1P) on spermatogenesis of frozen-thawed lamb testis explants in vitro. Thawed testicular pieces (~1 mm^3) was cultured for 12 days (D12) on agarose blocks in serum free growth medium containing 0, 2, 5 or 10 µM S1P. At the end of D6 and D12, three pieces/male were fixed in Bouin's fluid and processed for histology. The remaining two pieces were flash-frozen and processed for RNA isolation and quantitation of proliferation (PCNA, Ki67) and differentiation (PLZF) markers and genes involved in S1P signaling (S1PR1, SGPL1,SGPP1, AKT1 and NFKBIA) by qPCR. The histology and expression results demonstrated that S1P promotes germ cell differentiation and exerts an anti-apoptotic influence on the seminiferous tubule in sheep testicular explants in vitro. To our knowledge, this is the first report indicating important influence and potential mechanism of action for S1P in male germ cell differentiation. Further, using this culture system, we examined the effect of DEHP (di-2-ethylhexyl phthalate) and MEHP (Mono-2-ethylhexyl phthalate) on lamb testis in vitro. The histology of tubules and gene expression of steroidogenesis (CYP11A and STAR), apoptosis (caspase - 3), germ cell proliferation and differentiation (PCNA and DAZL) marker genes were not affected in DEHP (0 - 100 µM). However, these endpoints were adversely affected ($P < 0.05$) by MEHP at 0.1 µM concentration. The results indicated a dose-dependent adverse effect of MEHP on immature lamb testis functions, which is serious, and can lead to reproductive failure.

Reproductive seasonality and sperm cryopreservation in the male tufted deer (*Elaphodus cephalophus*)

Principal Investigator	:	Dr. Ram Pratap Singh
Co-PI	:	Dr. Budhan Pukazhenthi, Smithsonian Conservation Biology Institute, USA
Research Fellow	:	Dr. Saritvich Panyaboriban
Funding Agency	:	Smithsonian Conservation Biology Institute, USA
Collaborating Agency (if any)	:	Nil
Duration of the project	:	2 years
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	01.09.2014 to 31.08.2016
Annual Progress Report Period	:	NA
Expenditure incurred during the period	:	NA

The tufted deer is a small deer, listed as near threatened in the IUCN Red List, and there is no information available on the fundamental reproductive biology of this species. In this study, we report for the first-time, characterization of male reproductive traits and cryopreservation of semen. Male deers were subjected to electro-ejaculation during each season (*autumn*, *winter*, *spring*, *and summer*), and ejaculates were assessed for motility and quality traits. Fecal samples were collected 3 – 5 times weekly for two years and analyzed for androgen metabolites using enzyme immunoassay. Ejaculates with >70% motility were cryopreserved using Beltsville extender (BF5F) or Triladyl®. Straws were thawed and assessed subjectively as well as swim-up processed to isolate motile spermatozoa for CASA analysis and acrosome integrity at hourly interval. Tufted deer male reproductive and semen traits peaked in autumn. Mean fecal androgen concentrations were highest in the summer compared to baseline values during rest of the year. Sperm motility and acrosome integrity were lower immediately after thawing in both cryodiluents compared with raw ejaculates. Motility characteristics following swim-up were higher in BF5F compared with Triladyl. Four hour after thawing, both percent sperm motility and progression declined further and were similar between BF5F and Triladyl. However, the proportion of spermatozoa with intact acrosomal membranes was higher in BF5F than Triladyl. Results indicated that tufted deer exhibit seasonal variations in reproductive traits and that BF5F better preserves sperm motility and acrosomal integrity after cryopreservation compared with Triladyl.

Influence of cooling and thawing conditions and cryoprotectant concentration on frozen-thawed survival of White-naped Crane *(Antigone vipio)* spermatozoa

Principal Investigator	:	Dr. Ram Pratap Singh
Co-PIs	:	Dr. Budhan Pukazhenthi and Dr. Nucharin Songsasen, Smithsonian Conservation Biology Institute, USA
Research fellows	:	Dr. Saritvich Panyaboriban and Ms. Megan Brown
Funding Agency	:	Smithsonian Conservation Biology Institute, USA
Collaborating Agency (if any)	:	Nil
Duration of the project	:	2 years
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	01.09.2014 to 31.08.2016
Annual Progress Report Period	:	NA
Expenditure incurred during the period	:	NA

To assist in genetic resource management and recovery efforts of the White-naped Crane (*Antigone vipio*), we conducted this study to evaluate the effect of cooling condition, thawing rate, and cryoprotectant concentration on sperm survival post-thaw. Semen was collected from four mature males during the breeding season (March and April) and evaluated for volume, sperm concentration, motility, and membrane integrity. In Experiment 1, ejaculates (n = 8) were diluted with Beltsville Poultry Semen Extender (BPSE) containing 10% dimethylsulfoxide (Me_2SO) and frozen using either one (average cooling rate =2.5 C/min) or two step (average cooling rate = 7 and 9 C/min, respectively) cooling method. The frozen samples were thawed using one of the two thawing rates: 37^{0}C for 30s vs. 4^{0}C for 1 min. In Experiment 2, samples were diluted with crane semen extender containing either 6% or 10% Me_2SO, frozen using two step method and then thawed at 37^{0}C for 30s. Both cooling condition (two-step > one-step) and thawing rate (37^{0}C for 30s > 4^{0}C for 1 min) impacted sperm motility, progression and kinetic characteristics ($P < 0.05$), but did not ($P > 0.05$) affect plasma membrane or acrosomal integrity. The concentration of Me_2SO did not impact frozen-thaw survival. We concluded that White-naped Crane sperm cryopreserved using a combination of two-step cooling and thawing at 37^{0}C for 30s was superior to other cooling and thawing combinations regarding the sustaining sperm motility with good motility kinetics. Findings represent the first steps towards the development of effective cryopreservation protocols and the establishment of a genome resource bank for this threatened species.

Development of a microfluidic gas-liquid interphase 3-D tissue explant culture chip for fertility preservation

Name of the Investigator	:	Dr. Ram Pratap Singh
Co-PIs	:	Dr. Budhan Pukazhenthi, Smithsonian Conservation Biology Institute, USA and Dr. Don L. DeVoe, Professor, University of Maryland, USA
Funding Agency	:	UMD-SI Seed Grant, USA
Collaborating Agency (if any)	:	University of Maryland, College Park, USA
Duration of the project	:	1 year
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	01.06.2015 to 31.05.2016
Annual Progress Report Period	:	NA
Expenditure incurred during the period	:	NA

A myriad studies have been taken up during the past hundred years; still, it is not possible to induce in vitro spermatogenesis completely in testis tissue explant culture in any of the species, except fish and mouse. Therefore, we proposed to develop a new microfluidic interphase 3-D culture platform able to identify optimal culture conditions to achieve effective spermatogenesis using testes tissue explants. A larger scale interphase 3-D culture device was fabricated by sealing a continuous agarose sheet between a lower PDMS microchannel substrate and upper thermoplastic microwell layer (Fig. 1 & 2). This particular 32-well design included a flow splitter and microchannels with different hydrodynamic resistances designed to deliver growth medium to each column of the device at predetermined flow rate ratios from a single inlet port, allowing 4 different flow conditions to be evaluated in a single experiment. Testicular explants (54 explants; 8 explants in static culture; 24 explants per male in microfluid device) were cultured (34°C, 5% CO2) for two weeks in Minimum Essential Medium supplemented with 10% Knock-out Serum Replacement, pyruvate, glutamine, ITS (insulin, transferrin and selenium), testosterone, 2 mM Sphingosine-1-phosphate, and antibiotic cocktail. For the microfluidic device, the culture medium was loaded into a 10 ml sterile syringe and fitted to the Newton Syringe pump to maintain a constant flow rate (5 µl/min). The culture medium was replenished every 24 h in both the 'static' and microfluidic device. Three explants per flow rate were removed at a weekly interval and immediately fixed in Bouin's solution (4°C, overnight), sectioned and stained with hematoxylin-eosin. In contrast to the 'static culture system', tissues cultured using the 'microfluidic device' exhibited better structural organization and minimal apoptosis. The central core of all explants cultured in the microfluidic device was normal and contained intact seminiferous tubules. These data clearly demonstrated the beneficial effects of a microfluidic device compared with the 'static culture' system.

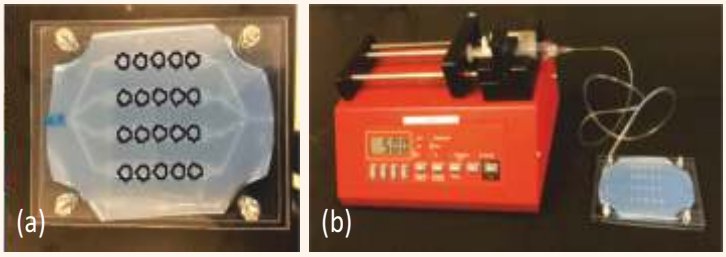


Figure 1 : Hybrid PC/PDMS/agarose microfluidic chip for multiplexed perfusive culture of tissue explants. (a) Fabricated device containing 32 microwells and parallel microchannels with varying hydrodynamic resistance allowing flow rate gradients to be established using a single syringe pump. (b) Experimental apparatus used for preliminary studies.

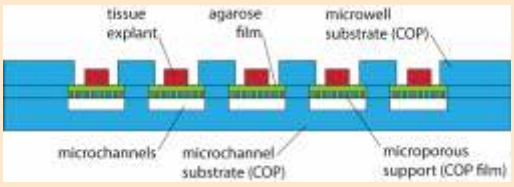


Figure 2 : Simplified cross-section of the proposed microfluidic interphase 3-D culture chip, revealing the microporous COP layer used to provide mechanical support and chemical bonding of the agarose film.

Extension

Red Junglefowl
(*Gallus gallus*)

Documenting the biodiversity of Sompeta wetland, Srikakulam District, Andhra Pradesh and developing biodiversity-mediated livelihood options for local communities

Principal Investigator	:	Dr. Mathew K. Sebastian
Co-PIs	:	Dr. P. R. Arun, and Dr. Rajah Jayapal
Research Fellow	:	Mr. Ramesh Kumar
Funding Agency	:	Paryavaran Parirakshna Samiti, Sompeta
Collaborating Agency	:	Nil
Duration of the project	:	11 months
Status of the Project	:	Completed
Date of initiation & completion of the Project	:	1 March 2016 & 31 January 2017
Annual Progress Report period	:	March 2016 to January 2017
Expenditure incurred during the period	:	Rs. 1,09,500/- (Expenditure met by the funding agency)

The Sompeta wetland complex spreads over nearly 1600 ha in Sompeta Mandal of Tekkali Division, Srikakulam District, Andhra Pradesh. It is locally known as 'Beela'. Beela is a low lying swamp or marsh area with a unique habitat for rich biodiversity with a distinctive hydrological regime. The survey was taken up with the objectives (i) to document the biodiversity of selected taxa such as avifauna, butterflies and odonates, and (ii) to explore and suggest biodiversity-mediated measures to enhance sustainable livelihood options for local stakeholders. The wetland complex was divided into sub-units as wetland and the surrounding habitat. Birds were sampled using point-count technique for woodland birds and vantage-point based total counts for water birds. Similarly, the Lepidopteran fauna was also assessed. A survey of the locally available resources, existing livelihood practices and options for the local people were carried out by participatory tools, questionnaires, and semi-structured interviews.

Data collection in the field

The wetland is a habitat for 491 plant species and 145 bird species that include migratory species. Forty six species of butterflies and 24 species of odonates (dragonflies and damselflies) were also recorded. The wetland and its environs give shelter to 74 % of the plants and 52 % of the birds found in the whole of Srikakulam District. It harbours Common Pochard (Aythya ferina), a globally Vulnerable species which has been consistently recorded from Sompeta wetland particularly from open moderately deep freshwaters. Besides, seven Near-threatened species (viz., Painted Stork, Spot-billed Pelican, Black-headed Ibis, Oriental Darter, Eurasian Curlew, Curlew Sandpiper, and Alexandrine Parakeet) have also been recorded in good numbers.

Our survey, covering less than 10% of the total wetland area enumerated a total of over 1500 water birds, and we are of the opinion that the entire wetland would hold more than 20,000 water birds in winter. In this regard, a suitable proposal in due format needs to be submitted to BNHS-India for their consideration during the next review of IBA network Sompeta wetland, with its high diversity of fauna and flora and its myriad roles, while rendering key ecosystem functions and services to local communities, would be a fit case for designation as a Community Reserve under the WildLife (Protection) Act of India, 1972.

Almost 60% of the local household rear cattle and the milch cows that yield high quality milk. The area harbours hundreds of acres of coconut plantation with above average yield. The entire coastal area is covered with Pandanus trees. The wetland is an ideal habitat for lotus plants. Therefore, it is suggested to establish a dairy in the cooperative sector, a cooperative society for establishing an industrial unit for the preparation of value added products from coconut, and small scale household units for the preparation of value added products from Pandanus, and lotus plant parts. In order to promote the wise use of the available natural capital available, promotion of ecotourism is also suggested.

Wetland Ecology

Crested Serpent Eagle
(*Spilornis cheela*)

Conducting baseline studies for Thane creek

Principal Investigator	:	Dr. Goldin Quadros
Co-PI	:	Dr. P. A. Azeez, Dr. Mahendiran Mylswamy, Dr. Shirish Manchi S., and Mr. R. P. Athalye.
Research fellows	:	Mr. Siddhesh Bhave, Mr. Amol M. H. Tripathi, Mr. Prathamesh Gujarpadhye, Ms. Sonia Benjamin and Ms. Janice Vaz.
Funding Agency	:	Mangrove Cell, Maharashtra and GIZ
Collaborating Agency (if any)	:	B. N. Bandodkar College of Science, Thane
Duration of the project	:	October 2015 to April 2016
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	November 2015 to April 2016
Annual Progress Report Period	:	2016-2017
Total Budget	:	Rs. 14,95,000/-
Expenditure incurred during the period	:	Rs. 5,98,000/-

The study on Thane Creek is based on the context of the GoI-GIZ-CMPA Maharashtra Project that intends to improve the protection of biodiversity by promoting participatory approaches to the conservation and management of coastal and marine Protected Areas (PAs), and supporting the creation of new PAs in the future. Stand and protocols were followed to address the following objectives designed by the funding agency viz. 1. Conducting a literature survey, 2. Document biodiversity and 3. Stakeholder analysis.

Birds along the mudflats of Thane Creek

The literature survey yielded 692 documents related to Thane creek which includes both published and unpublished literature with the earliest publication dated 1857. The biodiversity documentation revealed 15 mangrove species with dominance of Avicennia marina acutissima and Acanthus ilicifolius throughout the creek. The water quality revealed the narrow northern end of the creek to have concentrated levels of nutrients, low salinity and dissolved oxygen. The values showed a declining trend towards the broader seaward end. The sediments acting as a

trap for nutrients also showed a similar trend. The creek had become shallower and narrower with increased levels of silt.

The phytoplankton community comprised of 44 species, while zooplankton had 24 types representing eight phyla. The macrobenthos from the intertidal mudflats comprised 23 species representing five phyla. We recorded seven species of spiders and 72 insect species belonging to

Mangrove habitat of Thane Creek

33 different families and eight orders. Fishing activity was mainly restricted to the marine end of the creek. In total 15 species of fish were recorded. We also recorded four reptile species, six mammal species and had secondary evidences of Golden Jackal. One hundred and fifty five species of birds representing 52 families with 76 wetland and shore birds were documented that included six near-threatened and one vulnerable, species.

The third objective of stake holder analysis was addressed by either sending email or personal interviews or at meetings. The major and common concern was that of the restrictions being imposed by the forest department on the local fishers and the need to have a sanctuary. The fishers also seemed worried for their livelihood and expressed that the laws and rules should not marginalize them at the expense of the influential people.

Carrying out ecotoxicology of fishes, crabs and bivalves at Thane Creek

Principal Investigator	:	Dr. Goldin Quadros
Co-PIs	:	Dr. P. A. Azeez, Dr. Mahendiran Mylswamy, Dr. Shirish Manchi S. and Mr. R. P. Athalye.
Research fellows	:	Mr. Siddhesh Bhave, Mr. Amol M. H. Tripathi, Mr. Prathamesh Gujarpadhye, Ms. Sonia Benjamin and Ms. Janice Vaz.
Funding Agency	:	Mangrove Cell, Maharashtra and GIZ
Collaborating Agency (if any)	:	B. N. Bandodkar College of Science, Thane
Duration of the project	:	October 2015 to April 2016
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	November 2015 to April 2016
Annual Progress Report Period	:	2016-2017
Total Budget	:	Rs. 6,56,250/-
Expenditure incurred during the period	:	Rs. 2,62,500/-

Thane Creek (TC) is a triangular mass of brackish water which widens out and opens to the Arabian Sea in the South. The GoI-GIZ-CMPA Maharashtra Project intends to involve stakeholders at local, state and national levels. It is expected to make a contribution to the conservation of areas rich in biodiversity, without compromising the resource use and livelihood options of the local population. The objective of the study is to assess the impact of pollution on the biodiversity and bioresources of Thane creek.

Bivalves from Thane Creek

We estimated pesticide and heavy metals from different biotic and abiotic components of the creek. The Organochlorine pesticides like AlphaBHC, GammaBHC, BetaBHC, DeltaBHC, Heptachlor, Aldrin, Dieldrin, Endrin, Endosulphan, DDE, DDT, Methoxychlor were assessed and all were found below the detection limits of 0.5 mg/gm. The heavy metals estimated include Cd, Co, Cr, Cu, Fe, Ni, Pb, Zn, As and Hg in all the biotic and abiotic components. Cadmium varied between 0.0012 and 0.00412 mg/gm. Cobalt varied between 0.001 and 0.0545 mg/gm. Cromium varied between 0.0006 and 10.38 mg/l. Copper varied between 0.01 and 46.69 mg/l. The iron content in the creek varied from 0.34 to 485 mg/l. Nickel was found between 0.0005 and 0.83 mg/l. Lead varied between 0.0007 and 3.13 gm/l. Zinc values varied between 0.045 and 48.34 mg/L. Arsenic values were very low ranging between 0.0009 and 0.34 in the water. Mercury was found in significant amounts in all the abiotic and biotic components varying between 0.0007 and 0.39 mg/l. Further we also recorded varying concentrations of all metals in the feathers of birds including that of mercury and arsenic indicating a cause for concern about the Flamingo Sanctuary. The metals studied were all above the National standards set for marine waters as per the Environment (Protection) Rules, 1986. The status of the creek from the toxicological point of view indicates detrimental conditions for all living forms.

Preparing a brief document for wetlands in the forest areas of Maharashtra

Principal Investigator	:	Dr. Goldin Quadros
Co-PIs	:	Dr. P. A. Azeez and Dr. Shirish Manchi S.
Research fellows	:	Ms. Akshaya Mane, Mr. Siddhesh Bhave, Mr. Kuldeep K., J. Mhatre and Mr. Akshay Naik
Funding Agency	:	Mangrove Cell, Maharashtra and GIZ
Collaborating Agency (if any)	:	Nil
Duration of the project	:	July to December 2016
Status of the project	:	Completed
Date of Initiation & Completion of the project	:	July to December 2016
Annual Progress Report Period	:	2016-2017
Total Budget	:	Rs. 6,56,250/-
Expenditure incurred during the period	:	Rs. 10,51,800/-

The Maharashtra state has 3.3 % of its total geographical area under wetlands; Maharashtra Remote Sensing Applications Centre (MRSAC) (2010) reported 44,714 Natural and Man-made wetlands in the state including inland and coastal. The district-

Natural wetland in Chandrapur District

wise list of wetlands provided by Forest Department, Maharashtra, forms the basis of this 'Brief Document' prepared in accordance with the provisions of Rule 6 (3) of Wetland (*Conservation and Management*) Rules, 2010. The 'Brief Document' is based on structured discussion with forest department officials of various levels down to the beat-level, consultation of official maps, a rapid field survey and structured questionnaires. To comply with the time constraints, covering 626 wetlands in the state, we undertook an extensive but rapid field survey to assess the nature of the wetlands in terms of selected indicators.

Constructed wetland in Buldana District

The field surveys were undertaken from July to August 2016 and during November 2016. Two teams, with a minimum of three researchers in each, were assigned the field survey. The interactions with the forest field staff were crucial to gain information on wetlands in their jurisdiction including the rights and privileges of the wetlands. The interactions with the local inhabitants, farmers, shepherds, and cattle herders eliciting information as per the questionnaires supplemented the information of the wetlands.

We visited 328 wetlands within the jurisdiction of the forest department, of which 111 wetlands belonged to the revenue department, local municipality or private land holdings. 104 wetlands have water spread area over 50 hectares, 126 wetlands are less than 50 hectares but over 10 hectares and 98 wetlands are less than 10 hectares. Over 70% of the wetlands are human-made dams or reservoirs. The highest numbers of large sized wetlands are in Bhandara and Yavatmal Districts. From the rapid vegetation study, we observed that Tectona grandis, Butea monosperma, Ipomoea carnea, Parthenium sp and Cynodon sp. are the most common floral components within and around the wetlands. The faunal components recorded include 325 species comprising of 113 invertebrates, four species of amphibians, 16 species of reptiles, 169 species of birds and 23 mammals. Based on the ecological characteristics, we categorized 260 wetlands as oligotrophic, 24 mesotrophic while only three wetlands were eutrophic.

Nature Education

Nature Education Activities in SACON campus

One day Nature Awareness Programmes at SACON: Twenty three 'one day nature awareness programmes' for students were conducted on our campus. A total of 1810 students and 122 teachers participated in these programmes. Each programme included a nature trek, lectures in field, slide shows and interactive sessions with scientists.

Sálim Ali Naturalist Forum (SANF): We conducted several activities during the reporting period under the "Sálim Ali Naturalist Forum" (SANF), which is a platform for nature lovers of Coimbatore who love nature and want to learn and contribute towards nature conservation. SANF conducted five field programmes and five lectures during this period on campus that include bird watching and nature walk.

Nature Trail: A 'Nature Trail' has been established on campus. The Secretary, MoEFCC inaugurated the 'Nature Trail' on 24th March 2017. The 'Nature Trail' is 1.8 km long with paved pathway and 11 signages were made on acrylic boards and installed on different pedestals along the 'Nature Trail' in which details of biodiversity of SACON campus are highlighted. A brochure on 'Nature Trail' and campus biodiversity was released on the occasion of silver jubilee valedictory ceremony on 24.03.2017.

Brochures on Nature Education: To facilitate nature education programme on campus four brochures titled 'Know our Common Birds', 'Know our Common Butterflies', 'Know our Common Dragon flies' and 'Key for identification of common trees and shrubs on SACON campus' were prepared and they were released on the occasion of SACON silver jubilee valedictory ceremony on 24.03.2017.

SACON Silver Jubilee Lecture Series

During the Silver Jubilee Year, a series of guest lectures were organized for the general public of Coimbatore in collaboration with Young Indians of CII Coimbatore Chapter, which are as follows:

1. Dr. Mathew K Sebastian, Principal Scientist, SACON, delivered a talk on the "Primitive Tribal Groups of Nilgiris – Tribes in Transitions" on 28th April 2016 at DJ Conference Hall of CII building Coimbatore. Dr. Mathew presented the unique cultural and anthropological details of various tribal groups of Nilgiris and their present situation.

2. Mr. P. R. S. Rao , a farmer, researcher, author who works in the field of Biodiversity and Conservation policy and also in the field of Information and Communication Technology (ICT) for rural areas, delivered a lecture on 16th October 2016 on 'Paradigm Shift in Farming'; Farming in Tropics, particularly the Rainfed component which has the potential for Transformational Growth. Combining his research and farming experience, he evolved an innovative and adaptive farming method that has been successfully implemented in diverse agro-ecological settings in Karnataka.

3. Mr. Vivek Menon, Chief Executive Officer, Wildlife Trust of India, New Delhi and Chairman of Asian Elephant Specialist Group (IUCN – SSC) delivered a lecture on "Right of Passage; Conserving Elephants amongst a billion people" on 21st October 2016 in the Conference Hall of Chamber of Indian Industries, Coimbatore.

Sálim Ali Trophy Nature Competitions

Sálim Ali Trophy Nature Competitions for the year 2016-17 was conducted on 20th November 2016 at G. D. Matriculation Higher Secondary School, Coimbatore. More than 2000 students from 50 schools participated in the competition with nature and conservation as theme. In total, 120 students from 17 schools were awarded prizes. The Kongu Vellalar Mat. Hr. Sec. School, Karumathampatti won the overall Champions Trophy. Bharathi Mat. Hr. Sec. School, Thadagam Road, Coimbatore received the first runner-up prize, whereas G.D. Mat. Hr. Sec School, Coimbatore was adjudged as second runner-up. The prize distribution for the winners of individual and overall events was conducted on the occasion of Valedictory function of SACON Silver Jubliee Celebration on 24.03.2017.

Wildlife Week Celebrations

We conducted a week-long nature education and awareness programme between 2nd and 7th October 2016 on the occasion of Wildlife Week celebrations. First two days of the programme were conducted on SACON campus. On day 1, October 2nd, a programme of Sálim Ali Naturalist Forum for nature lovers of Coimbatore was conducted, which included the bird watching session, experience sharing and discussion about wildlife. On the second day, a programme for 60 college students was organized including a nature walk, lecture, slide show and wildlife film screening. The remaining four days (4th to 7th October 2016), 14 lectures on various topics of wildlife conservation were delivered by faculty members of SACON in one college and 13 different schools associated with SACON Nature education programme. After the lectures, a documentary film made by SACON on "Wildlife of Nilgiri Biosphere Reserve" was screened in all venues. More than 2500 students were benefited from these lectures.

Coimbatore Bird Race

We conducted (along with HSBC and The Yuhina Canopy, Mumbai) the 6th Edition of Coimbatore Bird Race on 29th January 2017. This was a dawn to dusk bird watching programme in which the competing bird watching teams travelled all around Coimbatore to record different bird species. At the end of the day, all bird watchers were assembled at Hotel City Tower, Gandhipuram, where they exchanged their experiences, received a memento and had dinner together. Ninety bird watchers participated this year and together they identified more than 200 species of birds in a day.

National Nature Camping Programme

National Nature Camping Programme is an initiative of the MoEFCC in environment education which is aimed at creating greater awareness, understanding and empathy of children with and for the environment. Through this initiative it was hoped that a 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 enhance qualities of leadership; and to explore nature. During the reporting year the MoEFCC sanctioned five camps to SACON and they were conducted in the month of February, 2017 on campus. In total, 220 students and 29 teachers participated in five camps. Two camps were conducted for children with special needs and other three were for children from two aided schools. Each one was a residential camp with a duration of three days and two nights.

Exploring Nature through Birds

Exploring Nature through Birds (ENTB) is a DST funded programme aimed to develop a module for science communication for nurturing careful observation and systematic documentation among children. First part was to develop a module for science communication. The second part was communicating those materials widely as possible. The module developed contains three books and four posters. These resource materials were disseminated extensively among school students facilitating participatory nature monitoring program designed for children. This is also helpful for bird watchers, nature enthusiasts, environmentalists and conservationists. The resource materials were distributed to teachers from 94 schools of 31 districts of Tamil Nadu, Kerala, Karnataka and Andhra Pradesh. The programme was introduced to children (~1000 numbers) and teachers in more than 100 schools in Coimbatore District. We presented programmes to school children (more than 3500 students) in our regular nature camps at SACON, Coimbatore. We distributed modules to all members of Sálim Ali Naturalists Forum (SANF), Agriculturists' Association, Art, Culture, Heritage, and 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 be freely downloadable for the registered ENTB participants online. SACON developed a team of mentors of the ENTB programme involving bird watchers, environmentalists and nature lovers, and distributed the module material to them to work as resource persons.

Initially the website ENTB online web portal (http://www.saconeducation.org/entb) was popularized, that later attracted many students, bird watchers, nature lovers and conservationists. At present we have 200 registered online ENTB members, who upload their observations on common birds.

ACADEMIC PROGRAMMES

Status of PhD scholars during the year 2016-17

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	Submitted
	M. Suhirta Muhil	Ph.D.	Ecology of Odonates in Coimbatore	Ongoing
	S. Srinidhi	Ph.D.	Assessment of management strategies of the bird hazards to aircraft in selected Indian Air Force airfields.	Ongoing
	J. Chaithrashree	Ph.D.	Study of paddy field biodiversity with reference to indicator taxa	Ongoing
	C. Divyapriya	Ph.D.	Acoustic analysis of coexisting birds in Anaikatty Hills.	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.	Study of population, ecology and conservation of lion-tailed macaque *Macaca silenus* in Sirsi-Honnavara, Western Ghats, Karnataka	Awarded
	Arijit Pal	Ph.D.	A study on the 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.	A study on the aggression and post-conflict afiliation in Nicobar long-tailed macaque (*Macaca fscicularis umbrosa*)	Ongoing
	Joydeep Shil	Ph.D.	Feeding ecology and social structure of golden langur (*Trachypithecus 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

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 (Synopsis submitted)
	S. B. Santhakumar	Ph.D.	Impact of developmental activities on bird communities along Sutlej river basin, Himachal Pradesh	Ongoing
	M. Samsoor Ali	Ph.D.	Water bird assemblage of human-made wetlands in Bhachau Taluk, Kutch District, Gujarat, India	Ongoing
	V. Anoop	Ph.D.	Impacts of wind power generation on select faunal components of a dry deciduous forest at Harpanahalli, Davangere	Ongoing
	V. A. Jins	Ph.D.	Reptile communities of Agasthyamalai Hills, Kerala, with emphasis on the distribution along elevational gradient.	Ongoing
Dr. Shomita Mukherjee	Pankaj Koparde	Ph.D.	Molecular phylogeny and comparative phylogeography of owlets of 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

ENVIRONMENTAL SCIENCES

Dr. P. A. Azeez	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
	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	V. Kirubhanandhini	Ph.D.	Levels of metal contamination in selected species of birds	Ongoing
	Mythreyi Devarajan	Ph.D.	Polycyclic Aromatic Hydrocarbon contamination in Pallikarnai Wetland, Chennai; Fish as an indicator	Ongoing
	Aditya Roy Ashimkumar	Ph.D.	Effects of environmental contaminants on the ecology and breeding biology of *Gyps* vultures in Gujarat	Ongoing

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Technical Reports

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Kumara H N, Singh M, Mukherjee S, Mishra P S, Velankar A D, Pal A and Vinoth S (2016). Social organization, behavior and phylogeography of Macaca fascicularis umbrosa on the Nicobar Islands, India. SACON Technical Report -PR-151, submitted to SERB-DST, Govt. of India. SACON, India,100pp.

Mahendiran M (2016). Assessment of the morphological diversity and the ecological patterns in the near threatened colonial water birds across Indian sub-continent using novel approach. Final Report (Ref No: SR/FT/LS-12/2011) submitted to Science and Engineering Research Board (SERB-DST), Government of India, 40pp.

Mukherjee S, Athreya R, Karunakaran P V and Choudhary P (2016). Ecological species sorting in relation to habitat structure in the small cat guild of Eaglenest Wildlife Sanctuary, Arunachal Pradesh. SACON, Technical Report No. PR-182, submitted by SACON, Coimbatore, Tamil Nadu, 52pp.

Mukherjee S, Robin V V, Mehta P and Koparde P (2016). Determining taxonomic and conservation status of the critically endangered forest owlet (Heteroglaux blewitti). SACON, Technical Report No. PR-4812, submitted to SACON, Coimbatore, Tamil Nadu. 82pp.

Quadros G, Manchi S S, Azeez P A, Mane A M, Bhave S D, Mhatre K K J and Naik A B (2016). Wetlands in the forest areas of Maharashtra - a brief document. Submitted to the Mangrove Cell, Maharashtra Forest Department, Mumbai, 349pp.

Quadros G, Azeez P A, Manchi S S, Mahendiran M, Athalye R P, Bhave S, Gurjarpadhaye P, Tripathi A, Benjamin S and Vaz J (2016). Conducting baseline studies for Thane creek. Submitted to the Mangrove Cell, GIZ, and Maharashtra Forest Department, Mumbai, 145pp.

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Sebastian M K, Arun P R and Jayapal R (2017). Documenting the biodiversity of Sompeta Wetland, Srikakulam district, Andhra Pradesh and developing biodiversity-mediated livelihood options for local communities. Final Technical Report submitted to Paryavaran Parirakshana Samiti, Sompeta, Srikakulam. Andhra Pradesh, 134pp

Sebastian M K and Arun P R (2016). Report on the one day workshop cum seminar on significance and conservation of traditional rice varieties in Kerala held at Koppam, Pattambi, Palakkad, Kerala. SACON, Coimbatore, 13pp

Singh M, Kumara H N and Velankar A D (2016). Population status of Rhesus Macaque (Macaca mullata) in Himachal Pradesh, India. SACON Technical Report -PR-150, submitted to Forest Department, Himachal Pradesh, SACON, India, 27pp

Book Chapter

Arun P R (2016). Environmental impacts of wind power. Chapter In 17th International Training Course on Wind Turbine Technology and Applications; Course Material. 447–448. NIWE, Chennai.

Books

Arun P R (2016). SACON Alumni Profile. SACON, Coimbatore. 80p.

Balasubramanian P, Sebastian M K, Arun P R, Pramod P, Kumara H N, Babu S and Sankar K (2017). Glimpses of SACON campus biodiversity. SACON, Coimbatore. 81p.

Seminars, Conferences, Workshops and Meetings participated

Arun P R. Environmental Impacts of Wind Power; Results of Two Case Studies. Paper presented at the WWF-GEER Stakeholder meeting on "Understanding the impacts of renewable energy scale up on ecosystems and

biodiversity" on May 5th, 2016, GEER Foundation, Ahmedabad.

Goldin Q. Coordinated and organised the 'Capacity building program to train the locals as Nature guides" at Sindhudurg as one of the objective of the project. The training was held from 14th to 19th October, 2016.

Goldin Q. Conference on Management and Conservation of seagrass ecosystems in India organised under CMPA by MoEF&CC and GIZ on 12th and 13th July, 2016 at New Delhi.

Jayapal R. Attended the 'Workshop on Kerala Bird Atlas & eBird Data Editors and Reviewers' held at Department of Wildlife Science, Forestry College, Kerala Agricultural University, Thrissur on 11th June, 2016.

Karunakaran P V. Designing Conservation Areas-Role of Plant Taxa. Paper presented in the National Conference on Modern Trends in Plant Science on 9th February 2017 at Payyannur College, Payyannur, Kerala.

Karunakaran P V. Workshop on Revision of Management Plan, Silent Valley National Park at Mukkali on 9thSeptember 2016

Karunakaran P V. Workshop on Revision of Management Plan, Silent Valley National Park at Mukkali on 27th September 2016

Kirubhanandhini V and Muralidharan S. Presented a paper on "Levels of heavy metals in selected species of birds in Gujarat at "Clean Up India 2016" International Conference on Contaminated Site Remediation from 13th to 15th December 2016. Organized by Tamil Nadu Agriculture University, Coimbatore.

Mukherjee S. Attended a Workshop to draft the Wildlife Action Plan for the Bharatpur region and Keoladeo National Park, organised by the Rajasthan Forest Department at Keoladeo National Park. 28th to 30th June 2016.

Mukherjee S. Attended the Annual Research Meet and the Advisory Board meeting of the Nature Conservation Foundation, Mysore. 25th to 31st July 2016.

Mukherjee S. Attended the Student Conference in Conservation Science (SCCS 2016) at the Tata Auditorium, Bengaluru. 18th to 25th September 2016.

Mukherjee S. Attended the Annual Research Seminar of the Wildlife Institute of India, Dehradun. 29th to 30th September 2016.

Pramod P. Five day stakeholder workshop on Western Ghats biodiversity and capacity building in geospatial tools at IIT, Hyderabad, between 20 – 25th June 2016.

Pramod P. "Participatory Planning workshop for conservation education in Manas" in Assam on 26th to 30th May 2016 attended as a resource person.

Pramod P. Attended and chaired a technical session 3rd National Biodiversity conference with the theme Mainstreaming Biodiversity for Sustainable Development organized at Thriuvananthapuram by Kerala Biodiversity Board on 23rd and 24th February 2017.

Singh R P. 49th Annual Meeting of the Society for the Study of Reproduction (SSR) from 16th –20th July, 2016 at San Diego, CA.

Singh R P. Student Symposium on August 8th, 2016 at Smithsonian Conservation Biology Institute, USA.

Talks delivered

Arun P R. "Diversity and Importance of Butterflies; The Flowers of Animal World". Talk delivered at the National Seminar on "Natural Environment; Status and Significance", at Govt. Brennen College, Tellicherry, Kerala on 20th January 2017.

Arun P R. "Diversity, Systematics and Importance of Butterflies". Talk delivered at the National Seminar on Modern Perspectives in Systematic Entomology at Govt. College, Kodenchery, Kerala on 25th January 2017.

Arun P R. "Biodiversity and Butterflies; Why should we conserve?" Talk delivered at Nirmala College for Women, Coimbatore on 29th September 2016.

Arun P R. "Importance of Biodiversity and Butterflies". Talk delivered at Yuvabharathi Public School, Kanuvai, Coimbatore on 4th October 2016.

Arun P R. "Learning from the Wild; importance of Nature Lessons". Talk delivered at John C Jacob Memorial, Kannur University, Kerala on 14th October 2016.

Babu S. Capacity building programme was conducted to the selected locals of Sindhudurg District as part of the completed research project sponsored by UNDP Sindhudurg Project, between 15-19th October, 2016.

Babu S. Field demonstration of capturing and ringing of forest birds at SACON campus during training programme on Monitoring and management of wetlands on 27th March, 2017.

Babu S. "Life of owls" at Konguvellalar Matric Higher Secondary School, Coimbatore as part of wildlife week celebrations on 4th October, 2016.

Babu S. "Owls in Andaman–a conservation perspective" at SACON Silver Jubilee Workshop on Ecology and Conservation of Andaman & Nicobar Biodiversity at Port Blair, Andaman & Nicobar Islands on 24th November 2016.

Balasubramanian P. Guest Lecture on "Bird-tree inter-relationships" was delivered at Pondicherry University, Pondicherry for the Refresher course participants of the Human Resources Development Centre, Pondicherry University, Puducherry, on 14th December, 2016.

Balasubramanian P. Lecture on "Role of birds in forestry" delivered at Kathiri mills Higher Secondary School, Coimbatore, on 5th October, 2016.

Balasubramanian P. Lecture delivered on "Vegetation profile of wetlands" for the participants of the two-day Training Programme on "Monitoring and management of wetlands" on 27th March, 2017.

Balasubramanian P. Ms. Whitney Endowment Lecture delivered on "Bird diversity and its conservation in India" at Lady Doak College, Madurai, Tamil Nadu, on 22nd September, 2016.

Goldin Q. Talk on "Conservation of Wetlands" while inaugurating the Naturalist Association of PSGR Krishnammal College, Coimbatore for Women on 15th July, 2016.

Goldin Q. Talk on "Role of Women in Marine conservation" during the one day workshop "Faculty development program - Women and Biodiversity" organised by the Department of Women's Studies , Bharathiar University, Coimbatore on 21st September, 2016.

Goldin Q. Talk on "Wetlands a tale of two cities - Coimbatore and Thane" during the National Conference on Wetlands on the occasion of World Wetlands Day" organised by Momin College, Bhivandi and Paryavaran Dakshata Manch on 1st and 2nd February, 2017.

Goldin Q. Talk on "Wetlands -Need for Conservation" while inaugurating the National wetlands conference organised by MES Ponnani College Kerala in collaboration with KSCSTE on 22nd February, 2017.

Karunakaran P V. 2016. "Biodiversity Conservation". Talk delivered to GKD Metric School, Coimbatore, Tamil Nadu as part of Wildlife Week Celebration on 5th October 2016.

Kumara H N. "Ecology of Long-tailed macaque in Nicobar Islands" at SACON Silver Jubilee Workshop on Ecology and Conservation of Andaman & Nicobar Biodiversity at Port Blair, Andaman & Nicobar Islands on 24th November 2016.

Kumara H N. "Mammals of Western Ghats" at Jaycee Matriculation Higher Secondary School, Vadavalli Road, Edayarpalayam, Coimbatore on 5th October 2016.

Mahendiran M. As a chief guest on the Valedictory function of the Wildlife Week Celebration at Nirmala College, Coimbatore, and gave a talk on the topic "Urban wildlife; conservation & significance of wetland birds in October 2016".

Mahendiran M. Plenary talk on "Exploring the Sexual

Shape Dimorphism of Painted Stork in India: Geometric morphometric Overview" at the International Conference on Current Challenges in Conservation of Biodiversity, Mayiladuthuari, Tamil Nadu India on 18th January, 2017.

Mukherjee S. Guest talk on her research work to officials from the Forest Department of Rajasthan, Van Bhavan, Jaipur on 27th June 2016.

Mukherjee S. Guest talk on her research work to faculty and students of the Laboratory for the Conservation of Endangered Species (LaCONES/CCMB), Hyderabad on 5th August 2016.

Mukherjee S. Guest lecture to the Second Year students of the BIO 211 Course in Ecology and Evolution at the Indian Institute of Science Education and Research (IISER), Tirupati on 5th November 2016.

Muralidharan S. Inaugural address at a training programme on ICP-MS, Bharathiar University, Coimbatore, on 16th March 2016.

Muralidharan S. "Do birds indicate impending threats to the environment" - Department of Biosciences, Sri Krishna College of Arts and Science, Coimbatore on 14th July 2016.

Muralidharan S. "Role of youth in the conservation of mother earth" Dept. of Science and humanities, Avinashilingam University, Coimbatore on 11th August 2016.

Muralidharan S. "Are we leading towards second silent spring?" Rotary Coimbatore Central Club, on 5th November 2016.

Muralidharan S. "Impact of pesticide contamination on birds- An Indian scenario" AVC College (autonomous) Mayiladuthurai on 16th February 2017.

Muralidharan S. "Ecotoxicology as tool, for environmental quality", Nallamuthu Gounder Mahalingam College, Pollachi, Tamil Nadu on 21st February 2017.

Muralidharan S. Valedictory address at the intercollegiate meet CheMystery 2017, Avinashilingam University, Coimbatore on 21st February 2017.

Pramod P. Inaugural lecture given in a topic "Biodiversity Conservation" at "Sustenance 2016 – World Environmental Day Celebrations 2016" organised by NSS College Nemmara, Palakkad, and Kerala State Science, Technology & Environment" at Nemmara, Palakkad, Kerala on 8th June 2016.

Pramod P. "Faunal diversity and its conservation with special reference to the role of women" on 21st September 2016 in Faculty Developmental programme of Bharathiar University, Coimbatore, Tamil Nadu.

Pramod P. "Changing pattern of Biodiversity in Western Ghats" at, Nirmala College, Coimbatore, Tamil Nadu in the "Symposium on preservation and sustainable management of biodiversity" on 29th September 2016.

Pramod P. Conservation of Natural Resources in connection Green Consumer day programme on 30th September 2016 in Avinashilingam University, Coimbatore, Tamil Nadu.

Pramod P. Conservation Education initiatives through DNA Clubs' in SACON Silver Jubilee workshop on Ecology and Conservation of Andaman & Nicobar Biodiversity' at Port Blair on 24th November 2016

Pramod P. Nature Education for conservation in the National Seminar on the topic Nature conservation : Need and Necessity on 9th December 2016 in Department of Zoology, Government Arts and Science College, Meenchantha Kozhikode, Kerala.

Singh R P. Talk on "Respiration in Birds" was delivered at SNS Academy, Coimbatore, Tamil Nadu on October 5th, 2016.

Singh R P. INSA Popular Lecture (as INSA Young Scientist) on "Plastics in Marine Environment" was delivered at Vidya Vanam School, Anaikatty, Coimbatore, Tamil Nadu on March 24th, 2017.

TRAINING PROGRAMMES / WORKSHOPS / MEETINGS

TRAINING PROGRAMME ON "INSTRUMENTATION AND ANALYTICAL TECHNIQUES"

A training programme on "Instrumentation and Analytical Techniques" was organized between 13th and 17th March 2017 by the Division of Ecotoxicology at SACON. Professor M. G. Sethuraman, Head, Department of Chemistry, Gandhigram Rural Institute-Deemed University, Dindigul, Tamil Nadu inaugurated the programme in a function presided over by Dr. K. Sankar, Director, SACON. Twenty three candidates from different streams such as chemistry, environmental sciences, environmental management, and wildlife biology from institutions, namely GITAM University (Vishakapatnam and Bengaluru), Periyar University (Salem), Defense Research Development Organization – Bharathiar University (Coimbatore), Avinashilingam University (Coimbatore) and AVC College (Mayiladuthurai) participated in the said training course. During the five-day-long programme, participants were exposed to the basic principles and working mechanism of analytical instruments, namely Gas Chromatograph, High Performance Liquid Chromatograph, Atomic Absorption Spectrophotometer, UV Spectrophotometer and Ultracentrifuge. Experts in the field of Analytical chemistry, namely Professor Avudainayagam, Head, Department of Environmental Sciences, Tamil Nadu Agricultural University, Mr. K. Chandrasekar, Application Scientist, Agilent Technologies, Dr. R. Jayakumar, Assistant Professor, Department of Environmental Studies, GITAM University (Bengaluru) delivered lectures as resource persons to highlight the applications of the instruments in ecotoxicological research. Dr. Rajah Jayapal, Principal Scientist, SACON, delivered a lecture on statistics at the programme. Director, SACON distributed certificates to the participants at the valedictory function.

TRAINING PROGRAM ON "MONITORING AND MANAGEMENT OF WETLANDS"

The MoEFCC sponsored training program on "Monitoring and management of wetlands" for the mid-level forest officers from southern states of India was conducted by SACON during 27th and 28th March, 2017. The officers from three southern states viz. Tamil Nadu, Telangana and Karnataka participated in the training program. The program was inaugurated by Dr. Rajeev K. Srivastava, IFS, Director, Tamil Nadu Forest Academy (TNFA), Coimbatore in the presence of

Mr. Chandan Singh, Dy. Director, MoEFCC, Govt. of India, New Delhi and Dr. K. Sankar, Director SACON. The inaugural program was attended by the faculty, staff and researchers from SACON and TNFA. The program schedule included nine class room sessions, one laboratory session and two field visits. The deliberations in the classroom were given by eminent wetland scientist, policy and decision makers including Dr. E. J. James, Dr. Brij Gopal, Dr. Rithesh Kumar and Dr. S. A. Hussain. The SACON faculty also shared their expertise on wetlands during the training program. The topics covered include Management of River Basins in relation to wise use of Wetlands; Population monitoring, census techniques of wetland birds; Vegetation profile of wetlands; Wetland habitat assessment and management practices; Ecotoxicological assessment of wetlands using birds as indicators; Environmental impact assessment in the context of wetland conservation; Integrated wetland management; what are wetlands and why manage them and how?; and ecology and management of Keibul Lamjao National Park, Manipur; case study with special reference to aquatic ecosystem. The participants were introduced to mist-netting and bird ringing techniques and were also taken to Ukkadam Lake and Perur Lake in Coimbatore city to understand the wetland characteristics in an urban setting where the bird census techniques were also explained. During the valedictory, the participants expressed their satisfaction on the course content while emphasizing on the need to have longer duration training programmes.

ONE DAY WORKSHOP CUM SEMINAR ON 'SIGNIFICANCE AND CONSERVATION OF TRADITIONAL RICE VARIETIES IN KERALA'

We conducted a survey and documentation on 'Ecological and ethno-cultural examination of the rise and fall of rice culture in southern India with special reference to the Western Ghats' from 2012 to 2014 with the financial support of Indira Gandhi National Centre for Arts, Ministry of Culture, Govt. of India. The states of Tamil Nadu, Kerala, Karnataka, Maharashtra and Goa were covered under the survey. Altogether information about 591 traditional rice varieties was gathered. During our survey from Kerala paddy fields 149 plant species, 51 butterfly species and 189 species of birds were recorded.

In order to disseminate the information collected about the traditional varieties to the different stakeholders such as farmers, Department of Agriculture, Agricultural University and individuals and organisations involved in the conservation of traditional rice varieties, a one day Workshop cum Seminar on the 'significance and conservation of traditional rice varieties' was held on 5th September 2016 at Abhayam, Koppam, Pattambi, Palakkad, Kerala which was jointly organized

by SACON and 'Abhayam', an NGO committed to organic farming and conservation of traditional rice varieties. Shri. V. S. Sunilkumar, Hon'ble Minister of Agriculture, Govt. of Kerala inaugurated the programme in a function presided over by Shri. Mohammed Muhsin, MLA, Pattambi. The message by Dr. K. Sankar, Director, SACON was read by Dr. R. Jayapal, Principal Scientist, SACON. Faculty of Kerala Agricultural University, Senior Officials of Dept. of Agriculture, Govt. of Kerala, representatives of NGOs and farmers involved in the conservation of traditional rice varieties from different parts of Kerala and representatives of Local Self Governance Bodies participated in the event.

In the morning session Dr. Mathew K. Sebastian, Principal Investigator of the research project, presented an overview of the status of cultivation of traditional varieties in south India with special reference to Western Ghats. Few of the participants who are prominent in the cultivation and conservation of traditional rice varieties shared their experiences. Faculty of Kerala Agricultural University viz. Prof. M. C. Narayanankutty, Prof. C. R. Elsy, Prof. Israel Thomas, Dr. Shaji James and Dr. P. V. Karunakaran and Dr. P. R. Arun Principal Scientists, SACON delivered talks on different aspects of the conservation of traditional rice varieties.

Group discussions were held on selected issues. There was a unanimous demand by all the participants that Government should take immediate and urgent steps to conserve and popularize the traditional rice varieties. These efforts should be complemented by sensitizing the younger generation about the significance and medicinal and neutraceutical properties of traditional rice varieties. The workshop also emphasised that it is imperative to reintroduce traditional rice varieties and traditional cultivation practices to bring back the lost glory of paddy cultivation in Kerala. There are several farmers who are still cultivating traditional rice varieties in Kerala and need government support in all aspects.

SMART INDIA HACKATHON-2017

Smart India Hackathon was a digital product building competition co-organised by AICTE, Ministry of Human Resource Development, MyGov, NIC and NASSCOM. As the Nodal Centre of the MoEFCC, SACON took the responsibility of developing the “Problem Statements”, technical guidance and giving input to the participants across the country. Subsequently SACON scientists conducted primary scrutiny of the project proposals submitted extended, technical support and

judgment of all MoEFCC projects in the Grand Finale. We envisaged 28 `Problem Statements' related to Environment, Wildlife and Climate Change and submitted to coordinating agency. Of these problems, students from across the country selected 21 Problem Statements and submitted 327 project ideas with details of objectives, methodology and expected output. All these project ideas were scrutinized and 54 projects were identified for the Grand Finale in Coimbatore. Grand Finale was conducted in Sri Krishna College of Engineering and Technology Coimbatore which was the Nodal centre on 1st and 2nd April 2017. First three winning teams were awarded cash prizes by MoEF&CC and the fourth and fifth winners were given cash awards by corporates.

WORKSHOP ON 'ECOLOGY AND CONSERVATION OF ANDAMAN & NICOBAR BIODIVERSITY' IN PORT BLAIR, ANDAMAN

As part of Silver Jubilee Celebrations, SACON organized a two-day workshop on 'Ecology and Conservation of Andaman & Nicobar Biodiversity' in Port Blair on 24th and 25th November 2016. The workshop deliberated upon various aspects of ecology and conservation of Andaman & Nicobar biodiversity. We invited researchers/scientists from all over the country who have worked or have been working on Andaman & Nicobar biodiversity to this workshop and they shared the rich experience of their valuable research work.

The programme was conducted in the auditorium of Regional Medical Research Centre, Indian Council of Research, Dolly Gunj, Port Blair. Dr. Alok Saxena, Principal Chief Conservator of Forests, Andaman & Nicobar Islands lauded the positive role SACON played in conservation of Andaman & Nicobar Ecology while inaugurating the workshop. Shri. M. S. Negi, Chief Wildlife Warden and PCCF of Andaman & Nicobar Islands, the Guest of Honour, during his address and highlighted the importance in natural resource conservation of Islands and invited all scientists to take proactive role in conservation of biodiversity. While Dr. K. Sankar, Director of SACON welcomed the gathering and delivered a talk on “Research activities and accomplishments (1990-2016) in Andaman & Nicobar Islands by SACON”. Dr. Vijayachari, Director, Regional Medical Research Centre delivered the felicitation address.

INFRASTRUCTURE AND FACILITIES

Over the years SACON has developed the infrastructure required for a modern scientific institute catering to its scientific activities and supporting services for the well-being of the research personnel, staff and visitors.

Being an institution committed to nature conservation, it was decided to have buildings for SACON in tune with its philosophy of 'ecofriendliness in every action'. Therefore, the renowned architect Late Mr. Laurie Baker, who was world famous for employing new and innovative technologies for constructing ecofriendly buildings, was requested to design the buildings. He proposed to construct the building for SACON by utilizing optimum space, natural light, and breeze and also providing open atriums in each building to develop gardens. The unique architectural and design features of the existing buildings in SACON campus has attracted the attention of a lot of students from architecture background from across the country as well as others interested in an aesthetically pleasing approach to building construction that is a cost effective alternative as compared to technologies of modern building construction. Centre for Science Technology for Rural Development (COSTFORD), Thrissur, Kerala undertook the construction of SACON buildings. At present the total built up area of SACON is more than 40,000 sq. ft. consisting of different blocks viz. Main office, Library, Laboratory, two Hostel buildings, Canteen and Guest house.

On 11th February 2000, SACON campus was dedicated to the nation by Hon'ble Minister of Environment & Forest, Govt. of India.

Sálim Ali Information Resource Centre (SIRC)

Sálim Ali Information Resource Centre (SIRC) is a modern library of SACON situated in a separate block amidst a serene ambience which houses a large collection of books, journals, periodicals, monographs, newsletters, theses, dissertations in the fields of ornithology, wildlife, ecology, zoology, botany, environmental conservation and natural history.

SACON Library has a rich collection of

- 3593 Books
- 183 Technical Reports,
- 65 Theses and Dissertations (PhD - 51, M.Phil - 14)
- 54 Current periodicals (National - 34 and International - 20)
- 3188 Bound research journals (back volumes)
- 2706 Maps, 117 CD/DVDs

Library Automation

All the documentary and non-documentary resources of the Library are computerized with bar code facility. Online Public Access Catalogue (OPAC) and Digital Library are initiated with the help of Smart Library Software for reference and circulation control. Local Area Network (LAN) - Intranet connectivity of SACON has been linked with the Library server to facilitate the online reference.

ENVIS

Environmental information plays a vital role not only in formulating environmental management policies but also in the decision making process aiming at environmental protection and improvement of environment for sustaining good quality of life for living beings. Realizing such need, the Ministry of Environment and Forests, Govt. of India set up an Environmental Information System (ENVIS) in 1983 as a plan programme for a comprehensive network in environmental information collection, collation, storage, retrieval and dissemination to varying users, which include decision-makers, researchers, academicians, policy planners and research scientists. ENVIS was conceived as a distributed information network with subject-specific centers to carry out the mandates and to provide relevant and timely information to all concerned.

The ENVIS Centre was established at SACON in the year 2004 with the theme "Wetland Ecosystems including Inland Wetlands". The centre collects, collates, and disseminates information on various facets of Wetland Ecosystems including Inland Wetlands of India. The SACON ENVIS publication "Lakes of Coimbatore City" had crossed 1234 reads in Research Gate. The centre was awarded 'A' grade for the years 2014-2015 and 2015-2016. Apart from secondary data collection, the centre also comes out with knowledge products such as newsletters, posters, pamphlets and calendars. The centre also conducts awareness activities about the importance of wetlands in schools and colleges on various environmental days. The SACON ENVIS team is coming up with the compilation of "A Bibliography of Tamil Nadu Wetlands" comprising around 2000 references collected from various Educational Institutions.

Wetland Ecology Laboratory

The Wetland Ecology Division conducts aquatic ecology studies and assesses physico-chemical characteristics of water and soil, identify and quantify plankton and benthic organisms and their role in ecosystem health. The laboratory is equipped with the following: 1) Vertical Laminar Flow, 2) Table top Dissolved Oxygen Analyser, 3) Table top Digital Turbidity meter, 4) Table top Digital pH meter, 5) Table top Digital Conductivity meter, 6) Portable Digital Thermometer and TDS meter, 7) Soil Test sieves with shaker, 8) Vortex shaker, 9) Magnetic stirrer, 10) Filtration Unit, 11) Micro Kjeldhal Assembly, 12) UPS, 13) Flame photometer, 14) Quartz Double Distilation Unit, 15) VIS spectrophotometer, 16) Hot air oven, 17) Water bath, 18) Mechanical Shaker, 19) Digital balance, 20) Induction Hot plate, 21) Heating Mantle, 22) Double door refrigerator (-18°C), 23) Dissecting Microscope, 24) Compound Microscope, and 25) Incubator.

Ecotoxicological Laboratory

Currently, our laboratory is equipped with 1) UV-Vis Spectrophotometer 2) High Performance Liquid Chromatograph (HPLC) with DAD and Florescence detector, 3) Water Quality analyzer, Portable PC testr35 4) Ultra Deep Freezer (-80°C), 5) Deep freezers (-20°C), and refrigerators 6) Flame Atomic Absorption Spectrophotometer (AAS) with 13 lamps, 7) Mercury Hydride Generator, 8) Gas Chromatograph, with three detectors, (Electron Capture Detector - ECD, Nitrogen Phosphorous Detector - NPD and Flame Photometric Detector - FPD), 9) ANG generator, 10) Microwave Digestion System, 11) Dissolved Oxygen (DO) Analyzer, 12) Biochemical Oxygen Demand (BOD) Incubator, 13) Flame Photometer, 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 20) Micrometer, 21) Digital Camera, 22) Thermo-hygrometer, 23) All Quartz Double Distillation unit, 24) Water purification system, 25) Hot-air Oven, 26) Induction Hot Plate, 27) Digital Caliper, 28) Soxhlet Mantle, 29) Ultrasonic water bath, 30) Desiccators, 31) Blenders, 32) Rotary spinner, and 33) Inverted microscope.

SACON laboratory facilities can also be used by other institutions for the analysis of physio-chemical properties of plants, soil, water and biological samples containing pesticides and heavy metals on payment basis.

Conservation Genetics Laboratory

The Conservation Genetics Laboratory, a new facility at SACON established during 2016-17, is furnished with various equipment to conduct basic molecular analysis on contemporary samples (e.g. tissue, scat, blood, saliva, feathers). The facilities include a 96-well gradient thermocycler with a Mini Satellite System to attach additional machines, PCR workstation, micro-centrifuge (Compact, strip tube and single PCR tube holders, 14,000 rpm), desktop centrifuge (for 24, 1.5-2.0 ml tubes, 14000 rpm,zx non-refrigerated), two sets of micro-pipettes, electrophoresis unit (Horizontal, middle sized with gel bed dimensions of 14 cm * 10 cm), UPS (minimum 2 hour backup, 115 V or 230 V, 50-60 Hz), Transilluminator for visualising agarose gels, three -200C deep freezers (one vertical 100L capacity and two horizontal (top-lid) with 345L and 500L capacities) for storage of samples, chemicals and DNA. A five day workshop in Conservation Genetics is scheduled from the 5th to 9th June 2017.

GIS Laboratory

A GIS and Remote Sensing Laboratory as a central facility was established under the Landscape Ecology Division of SACON during the financial year 2016-2017. Geographic Information System coupled with remote sensing data application is one of the most important tools in modern day ecological and other field based studies. It provides new capabilities for analyzing the space/time

distribution of ecological phenomena. The multi-disciplinary nature of the projects handled by the Centre necessitates the support of spatial tools and technicians who can handle the requirements of several conservation and management oriented research projects being taken up. The main objective of setting up the Laboratory is to enhance the capacity and capability of the researchers, students and other user groups of SACON to facilitate better interpretation of data. It also provides an opportunity for developing and sharing spatial data through a database since voluminous spatial and non-spatial information is being collected in various projects. The utility of such tools will provide better appreciation of research outputs such as reports and publications. The Laboratory will provide opportunity for the users by imparting training programmes and other similar academic activities. The Laboratory is equipped with, high end hardware such as workstation, server, printer and software both propriety and open source. On data front, the Laboratory got a good repository of Survey of India Top sheets, and a number of raster (satellite images) and vector data (shape file and thematic layers) of various biogeographic regions of the country.

National Ornithological Databank (NOD) Cell

Biodiversity information, marked by attributes like data reliability and currency, remains the cornerstone of our efforts to draw up conservation policies, strategies, and action plans. A vast majority of this key information even for well-documented taxa like birds and mammals remains scattered in scientific literature and project reports, most of which are inaccessible to user community leading to an apparent vacuum in biodiversity information sphere.

This is clearly untenable given the volume of precious resources - time, money, and intellect that have already been invested in generating knowledge on our vast biodiversity. Moreover, lack of access to biodiversity data often leads to duplication of efforts to collect the crucial information - a further drain on our resources. To overcome these issues of data irretrievability, biodiversity databases, standardized for scale and interoperability, need to be developed and commissioned for public use.

In an effort to fill in this gap, SACON has established the National Ornithological Databank (NOD) Cell, a data-portal on Indian ornithology in order to achieve the 'last-mile' connectivity between

data sources and user community. In fact, one of the objectives of SACON, as envisioned in its preamble, is "to create a databank on Indian ornithology and natural history, and disseminate knowledge relating to ornithology and natural history for the benefit of the community".

NOD Cell was formally inaugurated on 24th March, 2017 by Shri. Ajay Narayan Jha, IAS, Secretary, Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India in the presence of Dr. T. Chandni, Scientist-G and Advisor, MoEFCC.

The main objectives of the NOD Cell are:

- "To collate, organize, authenticate, curate, and make key information/data on Indian ornithology "To serve as a single-window clearing house on Indian ornithology and natural history.
- "To publish a serial 'Indian Ornithological Abstracts' that would give a periodical abstracting service of all the publications on various aspects of Indian ornithology.
- "To publish a quadrennial 'State of Indian Birds' report that would summarize the current conservation status of Indian birds and their habitats.

Currently, NOD Cell is working on developing a national database of ornithological theses and dissertations (popularly known as 'grey literature'), which form the bulk of the country's research outputs on birds and their conservation and yet largely remain unpublished. In the years to come, NOD Cell is planning to launch other verticals like species databases, conservation and avian PA management information portal, and ecological databases.
It is planned to curate all the data and make them available in an open-access web portal, which would be exclusively created for the NOD Cell.

Hostel

Hostel facility comprises of two separate buildings that can provide accommodation to 16 inmates.

Canteen

SACON Administration is running a canteen facility for hostel inmates, faculty, staff and visitors.

Guest House

The guest house has been renovated and opened for use by the visitors and guests. In total, 4 VIP rooms and one dormitory are available for use on payment basis.

Roof Garden

A roof garden with an area of 750 sq. ft is established on the roof top of Laboratory building to grow organic vegetables for our canteen use.

Kitchen Waste Composting Unit

A kitchen waste composting unit is installed behind Canteen to convert the kitchen waste into organic manure. The organic manure produced is used in the roof garden for cultivating organic vegetables.

Water Holes

Three water holes each with 4500 liters capacity were constructed on 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.

Wi-Fi Connectivity

The SACON campus has become 100% Wi-Fi enabled since March, 2017, which includes our main office, library, laboratory, hostel blocks (I & II), Canteen and the Guest House. Ten Wi-Fi modems have been provided on campus to enable the staff, research scholars and visiting dignitaries to access the internet connectivity at any time.

Car/Two Wheeler Parking Shed

A car and two wheeler parking shed was constructed during March 2017 with an area of 2050 sq. ft. The facility is available to all staff, research scholars and the visitors.

Recreation

Both indoor and outdoor recreation facilities such as volley ball, basketball and football courts, cricket ground, and table tennis are available on campus.

Details of ongoing and completed research projects/activities during the financial year 2016-17

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. Manchi Shirish S. Co-PI: 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 (*Aceros narcondami*) on Narcondam Island, India	Dr. Manchi Shirish S.	Nil	Nil	1.5 years	6,07,200	Ministry of Environment, Forest and Climate Change, Govt. of India	Nov 2010	Mar 2017	Ongoing
3.	Conservation of the Andaman Serpent Eagle (*Spilornis elgini*) in the Andaman Islands: Phase – I	Dr. Manchi Shirish S.	Nil	Shivkumari Patel	2 years	11,56,500	Raptor Research and Conservation Foundation, Mumbai	Dec 2014	Dec 2016	Ongoing

Details of ongoing and completed research projects/activities during the financial year 2016-17

4.	Identifying Indian cavity nesters most vulnerable to the loss of large trees	Dr. Mark Stanback, Professor of Biology, Davidson College, Dept. of Biology, Box 7040Davidson, NC 28035-7040. USA. Co-PI – Dr. Manchi Shirish S	Davidson College, Dept. of Biology, Box 7040 Davidson , NC 28035-7040. USA.		2 years and 6 months	1,35,900	National Geographic Society, USA through Davidson College, Dept. of Biology, Box 7040 Davidson, NC 28035-7040. USA	Dec 2014	June 2017	Ongoing
5.	Assessing anthropogenic threats to large carnivore population in the Western Ghats part of Tamil Nadu	Dr. T. Ramesh, Scientist and Ramanujan Fellow	Nil		5 years	1,00,000	Science and Engineering Research Board, Government of India	Mar 2017	Mar 2022	Ongoing
6.	Mapping key nesting sites of coastal and marine birds for identification of ecologically sensitive areas along Indian coasts	Dr. Rajah Jayapal	National Centre for Sustainable Coastal Management (NCSCM)	Ms. Madhumita Panigrahi	1 Year	4,25,000	National Centre for Sustainable Coastal Management (NCSCM)	July 2015	July 2016	Completed
7.	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)	June 2013	June 2016	Completed

Details of ongoing and completed research projects/activities during the financial year 2016-17

8.	Assessing the status and distribution of avifauna within 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	Sept 2014	Sept 2016	Completed
9.	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	Completed
10.	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)	Completed

Details of ongoing and completed research projects/activities during the financial year 2016-17

11.	Survey of small cats in Sanjay Gandhi National Park, Mumbai	Dr. Shomita Mukherjee, Mr. Nayan Khanolkar and Dr. P. V. Karunakaran	Maharas htra Forest Departme nt		1 year and 6 months	7,72,012	Maharashtra Forest Department	Mar 2017	Sept 2018	Ongoing
12.	A comprehensive study of potential ecological impact of windmill farms on wildlife with special emphasis on avifauna in Karnataka	PIs: Dr. H. N. Kumara & Dr. S. Babu		Mahesh D. Bilaskar, Malyasri Bhattacharya, Harif Parengal and Tamiliniyan	1 year and 6 months	36,00,000	Karnataka Forest Department-KREDEL-NIWE	May 2016	Oct 2017	Ongoing
13.	Spatio-temporal burrow use patterns by vertebrates in Keoladeo National Park, Bharatpur, Rajasthan, India	PI: Dr. S. Bhupathy (Late)/ Dr. Honnavalli N. Kumara (From 30/07/2014), Co-PI: Dr. Manchi Shirish S	Nil	Aditi Mukherjee	3 years	42,61,000	Dept. of Science and Technology, Govt. of India	June 2013	June 2016	Completed

Details of ongoing and completed research projects/activities during the financial year 2016-17

14.	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		Aakriti Singh	3 years	35,56,000	West Bengal	Mar 2016	Mar 2019	Ongoing
15.	Ecological investigations on five selected endemic trees and their conservation strategies in the forests of Tamil Nadu, India.	Dr. Chellam Muthumperumal Dr. P. Balasubramanian			3 years	32,90,000	Science and Engineering Research Board (SERB), New Delhi	May 2016	May 2019	Ongoing
16.	Habitat assessment of Mangalavanam Bird Sanctuary	Dr. P. V. Karunakaran. Dr. Goldin Quadros Dr. S. Babu		Mr. Kuldeep J.Mhatre	3 months	75000	Forest & Wildlife Department, Kerala	Mar 2017	May 2017	Ongoing
17.	Polycyclic Aromatic Hydrocarbons (PAHs) contamination in Palikaranai wetland, Chennai; fish as an indicator	Dr. S. Muralidharan		Ms. Mythreyi Deverajan	5 years	19,00,000	DST Inspire Fellowship	Feb 2015	Feb 2020	Ongoing

Details of ongoing and completed research projects/activities during the financial year 2016-17

18.	Surveillance of Waterfowl at Nalabana Bird Sanctuary, Chilika Lake, Odisha	Dr. S. Muralidharan				7,08,200	MoEFCC, Govt. of India	Mar 2009	July 2016	Completed
19.	Ecological baseline study for Palk Bay	Dr. P. A. Azeez, Dr. Goldin Quadros, Dr. Mahendiran Mylswamy, Dr. Shirish Manchi S		Akshaya M. Mane, K. A. Nishadh, V. J. Jins, and M. P. Swathi	1 year		GIZ, Indo-German Biodiversity Program, Conservation and Sustainable Management of Existing and Potential Coastal Marine Protected Areas in India (CMPA)	Nov 2015	Nov 2016	Completed
20.	Phthalates in the environment: Development of an in vitro model for studying the impacts of low levels on male reproduction	Dr. Ram Pratap Singh, Dr. Budhan Pukazenthi	Smithsonian Conservation Biology Institute, USA		2 years	$72000	United States-Indian Education Foundation	Sept 2014	Aug 2016	Completed

Details of ongoing and completed research projects/activities during the financial year 2016-17

21.	Reproductive seasonality and sperm cryopreservation in the male tufted deer (*Elaphodus cephalophus*)	Dr. Ram Pratap Singh, Dr. Budhan Pukazenthi & Dr. Saritvich Panyaboriban	Smithsonian Conservation Biology Institute, USA		2 years	NA	Smithsonian Conservation Biology Institute, USA	Sept 2014	Aug 2016	Completed
22.	Influence of cooling and thawing conditions and cryoprotectant concentration on frozen-thawed survival of white-naped crane (*Antigone vipio*) spermatozoa	Dr. Ram Pratap Singh, Dr. Budhan Pukazenthi, Dr. Saritvich Panyaboriban, Ms. Megan Brown & Dr. Nucharin Songsasen	Smithsonian Conservation Biology Institute, USA		2 years	NA	Smithsonian Conservation Biology Institute, USA	Sept 2014	Aug 2016	Completed
23.	Development of a microfluidic gas-liquid interphase 3-D tissue explant culture chip for fertility preservation	Dr. Ram Pratap Singh, Dr. Budhan Pukazenthi, Dr. Don L. DeVoe	University of Maryland, College Park, USA		1 year	$46000	UMD-SI Seed Grant, USA	June 2015	May 2016	Completed

Details of ongoing and completed research projects/activities during the financial year 2016-17

24.	Documenting the biodiversity of Sompeta wetland, Srikakulam district, Andhra Pradesh and developing biodiversity-mediated livelihood options for local communities	Dr. Mathew K Sebastian, Dr. P. R. Arun Dr. Rajah Jayapal		Mr. Ramesh Kumar	11 months	1,09,500	Paryavaran Parirakshna Samiti, Sompeta	Mar 2016	Jan 2017	Completed
25.	Conducting baseline studies for Thane creek	Dr. Goldin Quadros, Dr. Azeez P. A.	B. N. Bandodkar College of Science, Thane	Mr. R. P.Athalye Siddhesh Bhave Mr. Amol M H Tripathi, Mr. Prathamesh Gujarpadhye Ms. Sonia Benjamin and Ms. Janice Vaz	7 Months	5,98,000	Mangrove Cell, Maharashtra and GIZ	Oct 2015	April 2016	Completed

Details of ongoing and completed research projects/activities during the financial year 2016-17

26.	Carrying out ecotoxicology of fishes, crabs and bivalves at Thane Creek	Dr. Goldin Quadros, Dr. Azeez P. A. Dr. Mahendiran Mylswamy, Dr. Shirish Manchi	B. N. Bandodkar College of Science, Thane	Mr. R. P. Athalye Siddhesh Bhave Mr. Amol M H Tripathi, Mr. Prathamesh Gujarpadhye Ms. Sonia Benjamin and Ms. Janice Vaz	7 months	2,62,500	Mangrove Cell, Maharashtra and GIZ	Oct 2015	April 2016	Completed
27.	Preparing a brief document for Wetlands in the Forest areas of Maharashtra.	Dr. Goldin Quadros, Dr. Azeez P. A. Dr. Shirish Manchi		Ms. Akshaya Mane, Mr. Siddhesh Bhave Mr. Kuldeep K J Mhatre and Mr. Akshay Naik	6 months	10,51,000	Mangrove Cell, Maharashtra and GIZ	July 2016	Dec 2016	Completed
28.	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	-	-	MoEF&CC	2004	-	Ongoing

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