

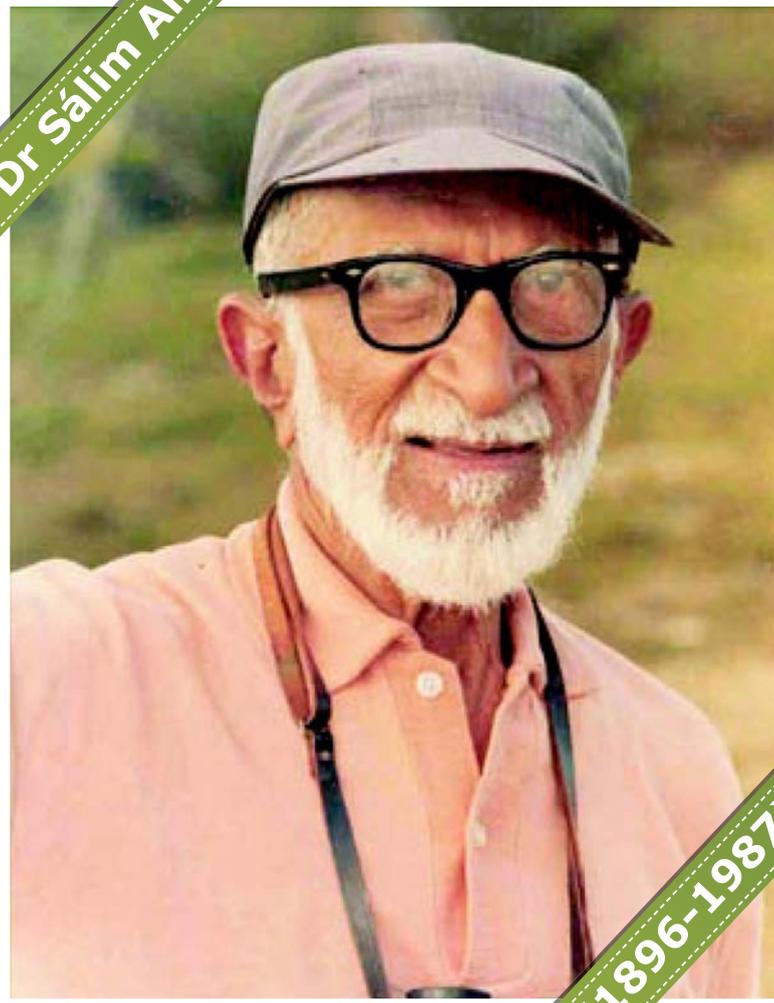


# SÁLIM ALI CENTRE FOR ORNITHOLOGY AND NATURAL HISTORY

ANNUAL REPORT 2010 - 2011



Dr Sálim Ali



(1896-1987)

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## BACKGROUND

Sálim  
Ali Centre for  
Ornithology and Natural History  
(SACON) funded by the Ministry of  
Environment and Forests (MoEF),  
Government of India, was established in 1990.

The management of SACON is vested in a  
Governing Council. The President of the SACON  
society is the Honourable Minister for Environment  
and Forests, Government of India and Chairman of  
the Governing Council is the Secretary to the  
Government of India, Ministry of Environment and  
Forests. Realising the significance of a holistic  
approach in avian studies and conservation, the  
major objectives of SACON have been  
designed to cover the entire field of natural  
history with ornithology at the centre  
stage.

## 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

The objectives of SACON are to

- ▶ 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 benefit of the community.

## Executive Summary

In the year 2010-11, SACON continued its research and conservation activities with enhanced vigour. In the year gone by, we have taken up 18 major programmes that cover research projects, environmental impact assessments, consultancy works, and nature education / extension activities. The research largely included species specific studies, ecological community / habitat studies and studies related to community conservation; areas where the local inhabitants are active participants while we offer technical knowhow and largely play the role of catalysts. As per SACON's objective, most of our studies are related to bird species, their habitats and associated species. However, we have also broadened our approach to other species including Lion Tailed Macaques, Fishing cats and reptiles, as these studies were expected to generate valuable information towards habitat conservation and understanding the ecological specificities.

Among the species specific studies on birds the one on Spot billed Pelican in Andhra Pradesh, and Edible nest swiftlets in Andaman & Nicobar Islands have been progressing with excellent outcomes. The Spot-billed Pelican, a globally near threatened species, important recommendations are submitted for their conservation actions in the state. Our in-situ conservation program, for the Edible nest swiftlet in its third phase, has resulted in notable population increase in the protected caves. The species has also started breeding in ex-situ Swiftlet houses made especially for the purpose.

Our study on the ecology of free-ranging Indian Rock Python is first of its kind in the country and has revealed several unknown ecological facts about the species. Valuable management recommendations have also come up from the study. India is home to 15

species of cats. Except the four big cats the small ones do not feature in any major research or conservation planning in the country. The distribution of the smaller ones especially the fishing cat in India is unclear. This study was undertaken to address the above facts and has identified several pockets where this species is distributed and suggested required conservation actions. The phylogenetic relationships among different populations are also being worked out.

A new population of lion-tailed macaque was discovered at Sirsi-Honnava, Karnataka and we felt it necessary to identify the threats faced by the species and the conservation actions required there. Our study pointed NTFP collection to be one of the major conflicts the species has with the people living in the area. We recommended developing an appropriate harvesting strategy so that these food items of macaques are available to them at an optimum level. Karnataka Forest Department considered this recommendation and incorporated them in their current management plan for the area. A study of large mammals was undertaken in Bannerghatta National Park, Karnataka on the request from the Karnataka Forest Department to provide inputs for preparation of conservation action plan for the park.

The tsunami on the fateful December 26, 2004 destroyed large stretches of coastal and mangrove forests in the Andaman & Nicobar Islands. It also resulted in a tilt in the land with the southernmost Nicobar Islands having sunk by about 1.6 meters while the Northern most Andaman Islands raised by about 1.2 meters. Considering these, the present project focusing on littoral forests including mangroves in the coastal areas of the Nicobar Islands is being carried out. Through this project, we have identified locations of poor colonization and appropriate species for restoration of littoral forests.

To strengthen the community conservation efforts by locals in north-eastern most state of the country Nagaland, a three-year program focusing on five eastern districts of the state was undertaken which culminated in this year. During this program we could document valuable indigenous ecological knowledge, effectively communicate the need for nature conservation, and facilitate formation of a few community conservation areas. One of our important findings was that such a programme should be extended to other districts of Nagaland and more than that a long term programme with appropriate funding needs to be taken up to keep up the tempo.

SACON assessed 20 wetlands spreading over 4 districts of Andhrapradesh and documented the flora and fauna available in those areas under the program 'Biodiversity assessment for environmental monitoring of medium/minor irrigation schemes in Andhra Pradesh'. Study of biodiversity in select wetlands of other districts is also progressing. Applications in free and open source geospatial tools has been effectively demonstrated in one of our studies on environmental conservation at Bhavanipadu Thermal power plant, Srikakulam district, Andhra Pradesh. Our program for coastal wetland mapping of Kerala, as a part of an exercise by the Kerala biodiversity board to document the wetlands of Kerala, could delineate 66,568 ha coastal wetlands in 9 districts of Kerala generating relevant statistics handy for conservation actions.

ISRO has undertaken a project covering the entire country addressing the concerns on land use change, human vulnerability and environmental change at the river basin level. As part of this exercise, the present study aims at documenting the land use and land cover dynamics in entire river basins of India during the last 30 years. During the current year, the MoEF under the chairmanship of Prof. M Gadgil constituted an expert panel on

Western Ghats Ecology to recommend measures for conservation and to help delineate Ecologically Sensitive Areas (ESAs) in the Western Ghats using the Geographic Information System framework. Upon request from the Expert panel we assessed the levels of Ecological Sensitivity of entire stretch of the Western Ghats.

SACON entered into a technical service contract with the Water Institute, Karunya University to evaluate the Wetland Ecology component for the project "Monitoring and Evaluation of Loktak Lake Management" being implemented by the Loktak Development Authority, Manipur. We evaluated the water bird monitoring done by the Forest Department-Wildlife Wing, Manipur and submitted our recommendations, on both research and management components.

As part of our ecotoxicological research, a comparative study of pesticide residues between organic and chemical farming in Padayetti village, Kerala was undertaken. We found significant difference in pesticide residue accumulation between the two systems of farming. As part of our work to assess environmental contaminants in birds in India we examined 125 dead individuals belonging to 30 species of birds and found DDT to be highest in concentration followed by total HCH and total endosulfan. Recently we have also initiated an investigation into Endosulfan persistence in Kasaragod and its impacts on human health and environment. As part of our Environmental Assessment programme, we have researched and drafted the Management Action Plan for Oussudu Sanctuary, Puducherry and submitted the same to the forest department to pursue it further. Several more environmental assessment programs are on and would be taken up in the coming financial year.

SACON has been pursuing our nature education programs in right earnest. We have undertaken several programs for Coimbatore and neighborhoods having conducted camps



for school students and teachers and nature education competitions for students. We support programs for training forest officials and have collaborated for summer courses organized by local universities. We are coordinating the DBTs Natural Resources Awareness Clubs for School Children, an initiative of the National Bio-resource Development Board (Department of Biotechnology, Government of India), in the A & N Islands. The program is progressing well and has offered good exposure to the local school children.

As per our commitment to the human resource development in the field we have so far guided more than 35 students for PhD degree, all of whom are well engaged in academic and research in fields related to conservation. During this financial year four students have submitted their theses or have been awarded the PhD degree. Some M Phil's and about a 100 MSc projects have been also completed under our guidance. The Eleventh training program in "Instrumentation and Analytical Techniques" was conducted during 16 to 20<sup>th</sup> August 2010 at SACON. We have also organized the 4<sup>th</sup> DST-SERC School in Herpetology from 24<sup>th</sup> January to 7<sup>th</sup> February 2011, in which 23 candidates (14 men, 9 women) representing 15 states, and seven core and 11 invited faculties participated.

SACON was honored to host Dr K Kasturi Rangan, Member, Planning Commission of India and former Chairman of Indian Space Research Organization on 6<sup>th</sup> March 2011. The honourable member was accompanied by Shri Ranjan Chatterjee, Dr Indrani Chandrasekhar, and Dr Vandana Dwivedi from the Planning Commission. The interaction of the SACON faculty and research scholars with the guests was highly encouraging and boosted our morale.

Every year SACON organizes the Sálím Ali Memorial Lecture. For the year 2010-11 Padma Bhushan Dr Ramachandra Guha, renowned writer and historian, delivered the

memorial lecture, talking on 'Ecological Town planning In India – the forgotten yet relevant legacy of Patrick Geddes'.

During the year, Prof. H F Rakotomanana from University of Anatananarivo, Madagascar worked at SACON upon receiving a senior fellowship from Federation of Indian Chamber of Commerce and Industry under C V Raman International Fellowship for African Researchers.

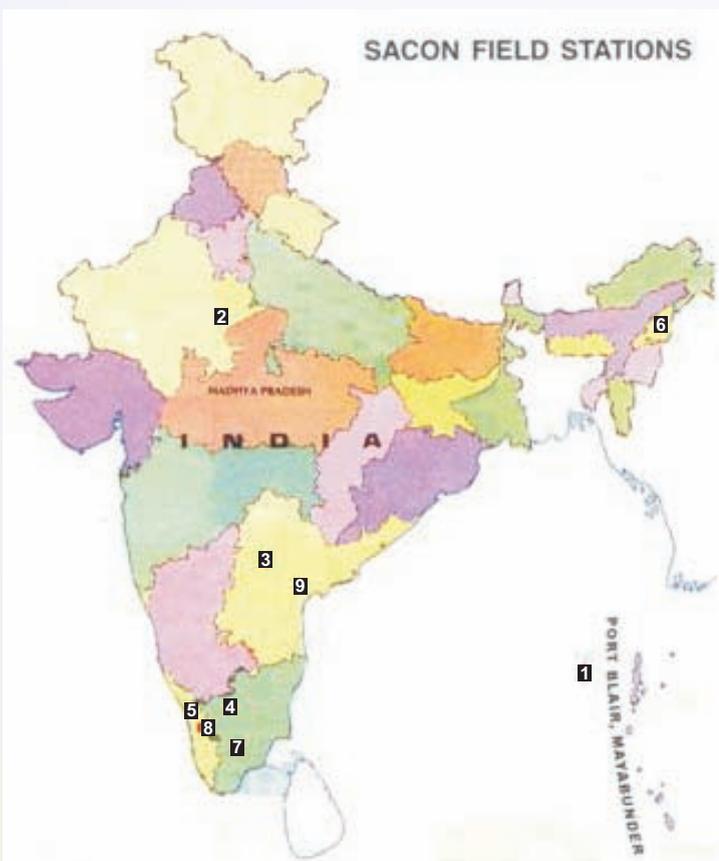
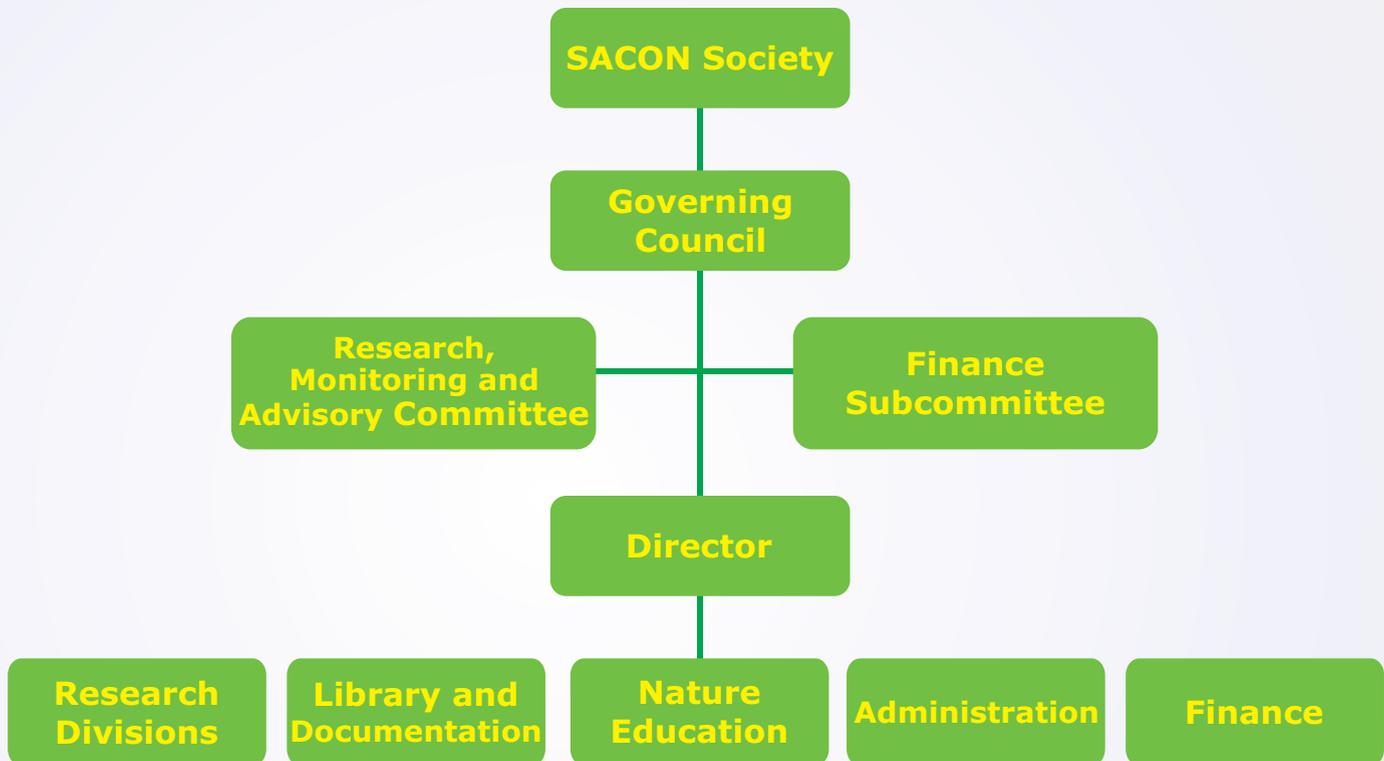
SACON entered into a Memorandum of Understanding with Indira Gandhi National Open University (IGNOU), New Delhi to conduct joint programmes in the areas of Environmental Impact Assessment and Management in distant education mode. We also plan to undertake a course of ornithology along the same line.

As in the former years SACON continued effectively communicating its research findings through peer reviewed publications. This year we published 26 articles in journals, made 29 scientific presentations in national / international conferences and published several articles in newsletters and other such publications.

To compliment the success so far achieved, SACON needs to further improve in terms of infrastructure, and research and conservation activities to reach higher further to the level of an international centre of repute in the field of ornithology and conservation. The faculty, researchers and other staff of SACON under the guidance of SACON GC, SACON Society and the Ministry of Environment and Forests, Government of India remains committed towards that. The Ministry of Environment and Forests have been very considerate in improving the facilities at SACON and in prompting us to take more and more research and conservation actions.

**P A Azeez**  
**Director**

## ORGANIZATION STRUCTURE OF SACON



### PROJECT AREAS

1. Mayabunder (A & N Islands)  
Campbell Bay-Great Nicobar
2. Bharatpur (Rajasthan)
3. Hyderabad (Andhra Pradesh)
4. The Nilgiris (Tamil Nadu)
5. Silent Valley National Park (Kerala)
6. Tuensang (Nagaland)
7. Vaigai (Tamil Nadu)
8. Sathyamangalam (Tamil Nadu)
9. Uppalapadu, Guntur (A.P)



## SACON Society

The Honourable Minister for Environment and Forests or nominee of Minister of State for Environment and Forests is the President of the SACON Society and the Director SACON is its Member Secretary. SACON Society at present has 29 members that include the President, members of SACON Governing Council and experts in the field of ornithology, wildlife sciences and management.

- 1. Mr Jairam Ramesh**  
President – SACON Society and  
Honorable Minister of State (IC)  
for Environment and Forests  
Government of India  
Ministry of Environment and Forests  
Paryavaran Bhavan  
CGO Complex, Lodhi Road  
New Delhi – 110 003
- 2. Mr Vijai Sharma, IAS**  
Secretary to the Govt. of India and  
Chairperson, SACON (GC)  
Ministry of Environment and Forests  
Paryavaran Bhavan  
CGO Complex, Lodhi Road  
New Delhi – 110 003
- 3. Mr E. K. Bharat Bhushan, IAS**  
Jt. Secretary and Financial Advisor  
Government of India  
Ministry of Environment and Forests  
Paryavaran Bhavan  
CGO Complex, Lodhi Road  
New Delhi – 110 003
- 4. Mr A. K. Goyal, IFS**  
Jt. Secretary to the Govt. of India  
Ministry of Environment and Forests  
Paryavaran Bhavan  
CGO Complex, Lodhi Road  
New Delhi – 110 003
- 5. Mr P R Sinha, IFS**  
Director  
Wildlife Institute of India  
P B No. 18, Chandrabani  
Dehra Dun – 248 001,  
Uttarakhand
- 6. Dr C. Swaminathan**  
Vice Chancellor  
Bharathiar University  
Maruthamalai Road  
Coimbatore – 641 046
- 7. Dr A. R. Rahmani**  
Director  
Bombay Natural History Society  
Hornbill House, Salim Ali Chowk  
Shaheed Bhagat Singh Road  
Mumbai - 400 023
- 8. Dr R. Sukumar**  
Chairman  
Centre for Ecological Sciences  
Indian Institute of Science  
Bangalore – 560 012
- 9. Prof. HSA Yahya**  
Professor  
Department of Wildlife Sciences  
Aligarh Muslim University  
Aligarh- 202 002
- 10. Prof. P. C. Bhattacharjee**  
Department of Zoology  
University of Gauhati  
Guwahati – 781 014
- 11. Mr R. G. Soni, IFS (Retd)**  
40/74, Swarn Path  
Mansarovar  
Jaipur – 302 020, Rajasthan
- 12. Dr P. Pushpangadan**  
Sree Sailam, T.C.X/910  
Mannammoola, Peroorkada  
Trivandrum – 895 005, Kerala

- 13. Prof. C. K. Varshney**  
88, Vaishali  
Pitampura  
Delhi – 110 034
- 14. Dr S. K. Dutta**  
PG Dept of Zoology  
North Orissa University  
Sriramchandra Vihar, Takatpur  
Baripada – 757 003, Mayurbhanj  
Orissa
- 15. Dr Krishna Kumar**  
Dean  
Indian Institute of Management –  
Lucknow  
Prabandh Nagar, Sitapur Road  
Lucknow – 226013
- 16. Dr T Sundaramoorthy**  
Head Biodiversity Conservation Education  
CPR Environmental Education Centre  
1, Eldams Road, Chennai - 600 018
- 17. Dr Lalitha Vijayan**  
Sr. Principal Scientist  
Division of Conservation Ecology  
SACON, Coimbatore
- 18. Dr S. Bhupathy**  
Principal Scientist  
Division of Conservation Ecology  
SACON , Coimbatore
- 19. The Principal Secretary**  
Department of Forest and Wildlife  
Govt. of Kerala, Secretariat  
Thiruvananthapuram – 695 001
- 20. The Principal Chief Conservator of  
Forests (WL) and  
Chief Wildlife Warden**  
Aranya Bhavan, Saifabad  
Hyderabad - 500 004  
Andhra Pradesh
- 21. Dr. Ramakrishna**  
Director  
Zoological Survey of India  
Prani Vigyan Bhavan  
M Block, New Alipore  
Kolkata – 700 053
- 22. The Director**  
Wildlife Warden  
Central Division  
Dachigam National Park  
P.O New Theed, Harwan  
Srinagar, Kashmir (J&K)
- 23. The Wildlife Warden**  
Silent Valley National Park  
Mukkali P.O  
Mannarghat, Palakkad Dist
- 24. Mr Shantanu Kumar (DGP retd.)**  
Firdauz Farms  
Kalwar Road, Zone C Bypass, Jotwara  
Jaipur – 302 001
- 25. Dr R. Uma Shaanker**  
University of Agricultural Sciences  
Department of Crop Physiology  
GKVK,  
Bangalore - 560 065
- 26. Ms Tara Gandhi**  
A1 Uttaravedi  
No 7, 2nd Seaward Road  
Valmiki Nagar, Chennai - 600 041
- 27. Dr G. Mustafa Shah**  
P.G Department of Zoology  
University of Kashmir  
Srinagar – 190 006 ,  
Jammu and Kashmir
- 28. Dr P. A. Azeez**  
Member Secretary and Director  
SACON,  
Coimbatore



## GOVERNING COUNCIL

The Governing Council is the executive organ of the SACON Society. The Chairperson of the 16 member GC is the Secretary to the Government of India, Ministry of Environment and Forests. The GC is advised by Finance Sub-Committee (FSC), and Research, Monitoring and Advisory Committee (RMAC). The Building Sub-Committee (BSC) oversee and advise on construction activities at SACON.

## MEMBERS OF THE GOVERNING COUNCIL

1. Mr Vijai Sharma, IAS, Secretary to the Govt. of India, Ministry of Environment and Forests, New Delhi (Chairman)
2. Mr E. K. Bharat Bhushan, IAS, Jt. Secretary and Financial Advisor, Govt. of India, Ministry of Environment and Forests
3. Mr A. K. Goyal, IAS, Jt. Secretary, Govt. of India, Ministry of Environment and Forests
4. Dr A. R. Rahmani, Director, Bombay Natural History Society, Mumbai
5. Dr R. Sukumar, Chairman, Center for Ecological Sciences, Indian Institute of Science, Bangalore
6. Dr C. Swaminathan, Vice Chancellor, Bharathiar University, Coimbatore
7. Mr P. R. Sinha, IAS, Director, Wildlife Institute of India, Dehra Dun
8. Prof. H. S. A. Yahya, Dept. of Wildlife Sciences, Aligarh Muslim University, Aligarh
9. Prof. P. C. Bhattacharjee, Dept. of Zoology, Guwahati University, Assam
10. Mr R. G. Soni, IAS (Retd), Principal Chief Conservator of Forests, Rajasthan
11. Dr P. Pushpangadan, Honorary Director General, Amity Institute for Herbal and Biotech Products Developments, Thiruvananthapuram
12. Dr C. K. Varshney, Professor (Retd), Jawaharlal Nehru University, New Delhi
13. Dr S. K. Dutta, Professor, PG Department of Zoology, North Orissa University
14. Dr Krishnakumar, Dean, Indian Institute of Management, Lucknow
15. Public Sector/ Enterprise/Banks (as of now vacant)
16. Dr P. A. Azeez, Director, SACON (Member Secretary)

## Research, Monitoring and Advisory Committee (RMAC)

The RMAC of SACON i) act an advisory body to the scientific and educational faculty of the SACON, ii) reviews scientific research proposals developed by the Centre iii) reviews and assesses scientific research projects implemented by the Centre, and monitor publication of dissertations, reports, papers in scientific journals and other publications, iv) conducts an annual review of all research and extension activities of the Centre and advises the Centre about changes required for improvement, and v) examines any new programs or suspend / abandon any of the ongoing ones, depending upon the utility and/or the level of participation.

The Governing Council at its 59<sup>th</sup> meeting held on 29<sup>th</sup> May 2010, reconstituted the RMAC of SACON. The names of the members of the re-constituted RMAC are given below:

1. Dr Sukhdev Thakkur, IFS (Retd.) 9, Baskaran Street, VOC Nagar, Pammal, Chennai – 600 075
2. Dr A R Rahmani, Director, Bombay Natural History Society, Hornbill House, Sálím Ali Chowk, Shaheed Bhagat Singh Road, Mumbai -400 023
3. Prof V C Soni, Department of Biosciences, Saurashtra University, Rajkot – 360 005, Gujarat
4. Dr B M Parasharya, AINP on Agricultural Ornithology, Biological Control Research Laboratory, Anand Agricultural University, Anand – 388 110, Gujarat
5. Prof B C Choudhury, Wildlife Institute of India, P.B. No. 18, Chandrabani, Dehra Dun – 248 001
6. Dr Mewa Singh, Department of Psychology, Manasagangothri, Mysore University, Mysore – 570 006
7. Dr S N Prasad, Senior Principal Scientist, Division of Landscape Ecology, SACON Regional Station, Tarnaka, Hyderabad 500017



## SACON STAFF

### SCIENTIFIC

Director	:	Dr P. A. Azeez
Conservation Ecology	:	Dr Lalitha Vijayan, Sr Principal Scientist (Gr.I) (Superannuated on 31 May 2010) Dr S. Bhupathy, Principal Scientist Dr Manchi Shirish, S, Scientist
Conservation Biology	:	Dr Shomita Mukherjee, Principal Scientist Dr H. N. Kumara, Scientist
Landscape Ecology	:	Dr S. N. Prasad, Sr Principal Scientist Dr P. Balasubramanian, Principal Scientist
Ecotoxicology	:	Dr S. Muralidharan, Principal Scientist
Environmental Impact Assessment	:	Dr P.R. Arun, Principal Scientist (From October 2010) Dr B. Anjan Kumar Prusty, Scientist
Nature Education	:	Dr P. Pramod, Senior Scientist
Extension	:	Dr Mathew K Sebastian (Rejoined in January 2011)

### TECHNICAL

Library and Documentation	:	Mr M. Manoharan, Library Assistant
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### ADMINISTRATION

Senior Finance Officer	:	Mrs. Jayashree Muralidharan ( Till 2 <sup>nd</sup> July 2010)
Finance Officer	:	Mr Karuppiyah (Till 31 <sup>st</sup> Dec 2009, on contract)
Jr. Administrative Manager	:	Mr R. Jayakumar
PA to Director	:	Mr V. Vaidyanathan
Accountant	:	Mr M. Muthupandi
Administrative Assistant	:	Mr S. Patturajan
Office Assistant	:	Mrs. R. Rajalakshmi
Stenographer	:	Mr M. Eanamuthu
Receptionist/ LDC	:	Mrs. M. Jayageetha
Site Engineer	:	Lt Col. (Retd) N Sundararaj (on contract)
Computer Assistant	:	Mr A. Srinivasan (on contract)
Drivers	:	Mr R. Ravi and Mr P. Subramanian
Office Attendants	:	Mr A. Devaraj and Mrs. V. Santhalakshmi

### NEW APPOINTMENT

Dr. P. R. Arun, joined as Principal Scientist in Environmental Impact Assessment Division in October 2010. An alumnus of SACON, after his PhD, worked with EIA division of SACON, Gujarat Institute of Desert Ecology (Bhuj, Gujarat), Environmental Justice Initiative, Socio Legal Information Centre (Mumbai) and the Green Alternatives (Mumbai) before joining SACON in the present capacity.



# RESEARCH HIGHLIGHTS



## 1. Ecology and Conservation of the Spot-billed Pelican in Andhra Pradesh

Supervisors	: Lalitha Vijayan and S N Prasad
Research personnel	: N Sheeba
Project period	: Five years
Date of commencement	: October 2006
Date of completion	: September 2011
Budget	: Rs 10.20/- Lakhs
Funding source	: University Grants Commission, New Delhi
Status	: Report submitted to UGC and AP Forest department

Spot-billed Pelican *Pelecanus philippensis* is a globally near threatened species. 7-9 breeding colonies of the species are seen in the east and south India (Andhra Pradesh, Karnataka, Tamil Nadu and Kaziranga Wildlife Sanctuary in Assam).

### Objectives

- ✧ Assess the current status and population of the Spot-billed Pelican in Andhra Pradesh

- ✧ Evaluate habitat requirements and factors determining habitat selection
- ✧ Understand its foraging and breeding ecology
- ✧ Examine potential threats to the population of the species and suggest conservation measures

### Research in brief

Although the recent increase in the



Spot-billed Pelican breeding populations is encouraging, it is imperative to take up awareness programme and appropriate management strategies to ensure long-term maintenance of Pelican nesting populations in the state. The variability in colony size in the study population was a result of a combination of various local scale ecological factors, probably related to the human induced activity at colony sites. Among the four preferred prey fish species *Cirrhinus mrigala* and *Puntius dorsalis* were important as major components of diet. Significant differences in prey size selection were recorded. However, temporal variation in diet; dietary changes during the breeding season, did not reflect concomitant changes in relative

densities of the prey species in the foraging ranges, suggesting the selective feeding by the birds.

### Recommendations

- ✧ Restrict recreational activity at nesting sites and protect from poaching and contamination from fishery industries.
- ✧ Management activity at the colony sites should be done in non-breeding season, taking care of the habitat quality.
- ✧ Protection actions, especially protection of nesting, may be taken up with community participation.
- ✧ Retain the water levels during breeding season.

## 2. Monitoring post-tsunami coastal ecosystem recovery in the Nicobar Islands and developing site specific restoration measures

Principal Investigator	: P Balasubramanian
Co-investigators	: P Pramod and DFO-Nicobar Division
Collaborative Agencies	: Andaman & Nicobar Forest Department
Research Fellows	: A P Zaibin and P Nehru
Duration	: Three years
Date of Commencement	: December 2008
Date of Completion	: December 2011
Budget	: Rs. 30.00/- Lakhs
Funding Source	: Dept. of Environment & Forest, A& N Islands

The tsunami on December 26, 2004 destroyed large stretches of coastal and mangrove forests in the Andaman & Nicobar Islands. It also resulted in a tilt in the land with the southernmost Nicobar Islands having sunk by about 1.6 meters while the Northern most Andaman Islands raised by about 1.2 meters. The impacts of Tsunami were wide and deep. It

physically uprooted coastal forests and mangroves, scorched littoral vegetation due to salt stress from seawater inundation, killed mangroves due to perennial submergence of the pneumatophores. It also led to seawater inundation of inland freshwater bodies, and destruction of marshes and creeks; and physical destruction of coral reefs. Considering

these factors, the present project was conceived with the objectives mentioned below. The study is being carried out in the coastal areas of the Nicobar Islands focusing on littoral forests including mangroves.

**Objectives**

- ✧ Assess and monitor vegetation regeneration in tsunami affected areas
- ✧ Monitor species of fauna that inhabit coastal ecosystems, focusing on the Nicobar Megapode and Robber Crab
- ✧ Make appropriate site specific recommendations to restore damaged habitats.

**Research In brief**

The study presents the post-tsunami scenario of vegetation regeneration and avifaunal diversity in the tsunami affected coastal habitats of Nicobar Islands. The richness and diversity of plant species were higher in the littoral forests, which has already reached a new growth forest stage. Mangrove regeneration is slower and the

regenerating sites are represented by 16 species. Eighty-two bird species were recorded in the tsunami-affected sites. Nicobar Megapode has been sighted in several sites and its population is reviving. Robber Crab sightings were very low indicating higher impacts of Tsunami on the species.

**Recommendations**

For habitat restoration programme it is necessary to concentrate on poor re-colonization sites than the sites where natural regeneration of trees is better. We have identified six such locations of poor colonization. Appropriate tree species for the restoration of littoral forests including mangroves were identified and recommended.



**3. Strengthening community conservation efforts in Nagaland: A program to impart technical support on biodiversity conservation and livelihood options to communities; Phase 1: Phek, Tuensang, Longleng, Kiphire and Mon districts.**

- Programme Coordinator : Vengota Nakro
- Associate Coordinators : Ravi Sankaran (till 17 January 2009);  
S Bhupathy and P A Azeez (since February 2009)
- Collaborative Agency : Nagaland Empowerment of People through Economic Development, Kohima
- Duration : Three Years
- Date of Commencement : April 2007
- Date of Completion : October 2010 (with six months no cost extension)
- Budget : Rs 287.13/- Lakhs
- Funding Source : Sir Dorabji Tata Trust



The Northeastern India is also a biodiversity hot spot in the country. This area is dominated by diverse indigenous communities. In Nagaland over 95% of the forests are owned by the local communities and it is pertinent to involve them in environment protection and conservation. Three major factors directly affect biodiversity in the region; jhum cultivation, hunting and timber extraction. In this background, the present programme was initiated in five eastern districts of Nagaland to strengthen local communities' involvement in environment conservation.

**Objective**

- ✧ Assist villages, which have or propose to have community conservation areas, in developing biodiversity registers, resource maps and management plans, and develop the process by which biodiversity registers are legally protected,

- ✧ Advocate and assist in establishing community conservation areas where such efforts are currently lacking,
- ✧ Document Indigenous Ecological Knowledge,



- ✧ Identify technical, developmental and financial requirements of community conservation areas,
- ✧ Provide necessary technical support and linkages on information, processes, markets and developmental and financial programs, to villages developing community conservation areas, and
- ✧ Use the Blyth's Tragopan, the state bird of Nagaland as a flagship species in enhancing conservation reach.

Land Use and Land Cover and Change Detection Analysis using GIS Platform showed that 46.8% of Evergreen Forest has been lost between 1991 and 2007. 16.4%



decrease in Jhum cultivation and 59.3% increase in abandoned Jhum was also seen. Status of forests in 230 CCAs has been documented. Data analysis during the reporting period showed that locals consumed 48 mammal and 38 bird species. It is apparent that conservation message is spreading wide in the area; in all, about 180 articles appeared in various print media on the activities/ environmental issues of Nagaland in local, regional, national newspapers, magazines and newsletters.

### Recommendations

To strengthen the community conservation efforts by locals, a long-term programme with appropriate funding is required. Funds for protection of CCA from intruders, creation of corridors between/ among CCAs to make the conservation sustainable, and further awareness programme to take locals into confidence is needed. This programme should be extended to other districts of Nagaland. Biodiversity inventory in the CCA using standard sampling protocols is required

#### 4. Ecology of the endangered Indian rock python, *Python molurus* in Keoladeo National Park, Bharatpur, Rajasthan, India

Principal Investigator	: S Bhupathy
Research Personnel	: C Ramesh
Duration	: Three years
Date of Commencement	: 2 <sup>nd</sup> August 2007
Date of Completion	: 21 <sup>st</sup> August 2010
Budget	: Rs. 11.06/- Lakhs
Funding Source	: MoEF (Wildlife Division)
Status	: Completed

Of the 517 species of reptiles reported from India, snakes contribute about 60%; but in-depth studies on them are scanty. The Indian Python is one among the large non-venomous snakes in the world. Despite wide distribution of this species in India and south and south-east Asia, its ecology is poorly understood. The present study in Keoladeo National Park (KNP) is first of its kind on the free ranging Indian Python *Python molurus molurus* in the country.

#### Objectives

✧ Study the population trend in

python in KNP comparing results from earlier studies,

- ✧ Gather data on aspects of ecology of Indian python such as population, basking, burrow fidelity and ranging, cohabiting species in the burrow and food habits,
- ✧ Assess the impact of tourists on the basking and movement patterns of pythons,
- ✧ Propose conservation plan for Indian Pythons found in the area and assess the disturbance, if any.



## Research In brief

We studied various aspects of ecology of Indian Python in Keoladeo National Park, Bharatpur. About 100-180 Pythons inhabited 50 ground burrows located in saline patches dominated by *Salvadora-Acacia* community. We observed several species of mammals co-existing with pythons in the ground burrows. Pythons moved on an average  $770.38 \pm 880.73$  m (range 0-3727.09 m). In winter, high diurnal activity of the species was recorded during 1200 – 1400 hrs. Predominant preys of pythons were mammals and birds. Pythons have longer breeding season (mating in February and hatching in August).

It was generally believed that incubating female pythons would stay with eggs till hatching. However, the present study revealed that incubating snakes naturally leave the nest about two weeks prior to hatching. In Zoological gardens (Zoos)/ Captive Breeding Centres (CBC) it is believed that snakes abandon the nest due to reasons such as starvation. After the snake abandons nests, the officials shift the eggs to incubator. This could be one of the reasons for the poor hatching success of the species in captivity (i.e. <50%).

## Recommendations

It is suggested that an assessment of python population could be done every year from 2<sup>nd</sup> fortnight of January to 2<sup>nd</sup> fortnight of February in KNP and in other North Indian states, as the snakes come out from the ground burrows in large numbers for basking during this period. Institutions such as the SACON and Wildlife Institute of India could provide the required

training to the field personnel of the Forest Department.

Greater germination, sprouting and growth of *Prosopis juliflora* was observed subsequent to the removal /control of this weed in the Park. *Prosopis* eradication programme should be pursued vigorously during monsoon removing the seedling and uprooting the saplings for many years to yield desired results. However, *Prosopis* control activities should not be done between November and April as many snakes emerge out from burrows for basking during these months.

Sporadic hunting of Porcupine *Hystrix indica* happens in the area, and increased patrolling in Python areas during monsoon would reduce this problem.

It is felt that the wetland area in the Park has become shallow than that of early 1980s as slight increase in the quantum of water input leads to inundation and collapse of ground burrows.

National Highway 11 is nearby the Park, a signage regarding the speed limit for vehicles and a message conveying 'animal crossing the road' would help reducing mortality of pythons and other animals from vehicular traffic.

It is suggested that if abandoned nests of Pythons found, should be left without disturbing, but care must be given to protect the nest from predators. In captive breeding programmes of pythons at Zoos/ CBC, the nest temperature should be maintained at 31.1 - 33.9°C at moderate humidity (40-60%) and good aeration at least during the later part of the incubation (i.e. after 55 days).

## 5. Conservation of endangered species and habitats; the Edible-nest Swiftlet in the Andaman and Nicobar islands

Principal Investigators	: Manchi Shirish S
Collaborative Agencies	: Department of Environment and Forests, Andaman and Nicobar Islands
Research personal	: Harshada Pethe and Ravikanth Manchiyerla (till November 2010), Pankaj Khoparde and Ngulkhola Kongsai (From December 2010)
Duration	: Five years
Date of Commencement	: 1 <sup>st</sup> April 2009
Date of Completion	: On-going
Budget	: Rs. 7.06/- Lakhs (For year 2010-11)
Funding Source	: MoEF (through Department of Environment and Forests, A & N Islands)

◆ On the successful completion of Phase-I (1999-2002) and Phase-II (2002-2008), the Phase-III of the Project has been underway since 2009. In this project we aim to conserve the Edible-nest Swiftlet in the Andaman & Nicobar Islands. Since 1999, significant progress has been made; up to 75% increase in population already achieved at our focal sites. We are in the process of establishing a population of Edible-nest Swiftlet in a house; nest building and egg laying have taken place; and have demonstrated that this approach will lead to far wider recoveries in population of the swiftlets and positively benefit the islands

### Objectives :

- ◆ Research and development
  - ✧ Develop technology and methodology to attract and induce Edible-nest Swiftlet to breed in human habitation,
  - ✧ Continue ongoing studies on the breeding and foraging ecology of the species,
  - ✧ Study longevity and dispersal patterns of the Edible-nest Swiftlet.

### ◆ In-situ conservation

- ✧ Consolidation and expansion of cave sites where conservation action is being implemented from the existing two to eight (5 in the Andaman and 3 in the Nicobar), where nest-collectors will be organised and supervised in scientifically managing Swiftlet colonies,
- ✧ Establish scientific harvesting systems.

### ◆ Ex-situ conservation

- ✧ Development and expansion of the number of houses in which the Edible-nest Swiftlet breed, thus establishing alternate populations and enabling widespread ranching of swiftlets from houses;

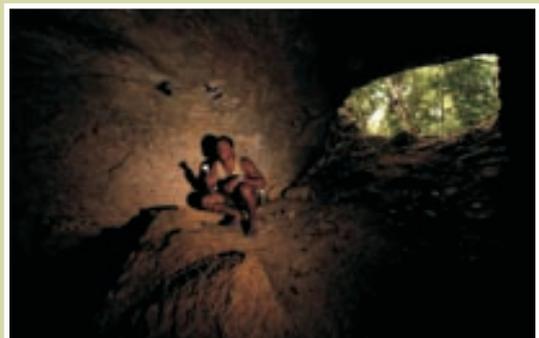


Photo : Kalyan Varma

conservation of the Edible-nest Swiftlet.



Photo : Kalyan Varma

- ✧ Establish scientific harvesting systems in Edible-nest Swiftlet colonies in houses.
- ◆ Swiftlet Conservation-operative
  - ✧ Set up a co-operative to establish market linkages for the nests harvested under supervised scientifically managed systems, which is fundamental to the

### Research In brief

After the success in protecting 1477 nests and fledging 1979 chicks through in-situ conservation during the season in 2010 at all three sites in North and Middle Andaman Islands, all three camps were reopened in January. Compared to the breeding population in protected caves during 2010, more than 16% (further increase in percentage is expected) growth was observed by March 2011. Ex-situ conservation has also shown noticeable progress as two nests of the Edible-nest Swiftlet are observed in the ex-situ swiftlet house at Tugapur in Middle Andaman Island.



## 6. Phylogeography of the fishing cat (*Prionailurus viverrinus*) in India: identifying populations for conservation.

Investigator	: Shomita Mukherjee
Funding Agency	: Panthera Foundation, New York
Budget	: Rs. 386306/-
Co-Investigator	: Uma Ramakrishnan, NCBS, Bangalore
Collaborating Agency	: National Centre for Biological Sciences, Bangalore
Date of commencement	: 1 <sup>st</sup> April 2010
Date of completion	: 31 <sup>st</sup> May 2011 (after a two month no-cost extension)

India is home to 15 species of cats, the highest number any country has (Nowell and Jackson, 1996). Yet, apart from the four big cats, the small ones do not feature in any major research or conservation planning. The distribution of the fishing cat in India is yet unclear and recent surveys for mammals in some potential fishing cat habitats have not yielded any positive result. With no specific focus on the species, the distribution currently projected within India is largely an expected / predicted presence of the cat in its potential habitats, from records in the past. In fact, most reported fishing cat records are from protected areas. The species perhaps also exists outside the protected area network in the country and these populations could be crucial to maintain genetic connectivity between populations. However, no information is available on such populations.

One reason why many small cats have not been studied is the difficulty they pose due to their cryptic habits and rarity. Advancement in molecular techniques in the past few decades has now made it possible to circumvent this and address questions related to rare and endangered species with higher precision and accuracy.

### Objectives

- ♦ Study genetic variation of the fishing cat in India and identify populations that need urgent conservation attention,
- ♦ Using results from the above objective, we aim to identify large connected habitats suitable for the fishing cat in India, using imageries and Geographical Information System and conduct surveys in these for presence,
- ♦ Compare fishing cat distribution and genetic variation to already existing data on jungle cat and leopard cat from India: Can abundance and distribution of a species be used to predict its genetic variation and genetic structure?
- ♦ Relate genetic and spatial data to environmental/landscape variables for the fishing cat, leopard cat and jungle cat. What limits cat distributions?
- ♦ Identify populations of fishing cats, across its global range that need urgent conservation attention, using non-invasive molecular techniques.

### Research In brief

Very little is known of the distribution and status of this medium



sized cat. Being rare and nocturnal makes it a very difficult study species and hence very few studies have been attempted on this cat. For using molecular tools, 156 scats were collected from 6 states in India. One skin of unknown location was obtained from Assam. One tissue sample of a dead fishing cat was obtained from Aima village, Howrah district, West Bengal. Only 19 (12%) of the 156 scats were of fishing cats and this indicates the rarity of the species. Even with a small sample size it is clear that the fishing cat has considerable genetic variation within the country. From this we can infer connectivity in habitat from the Terai region of Uttarakhand and Uttar Pradesh through Nepal, Assam, Bengal, Orissa.

The fishing cat seems to be safe in the Terai belt. The population in Coringa is very small but safe and a survey specifically through the Andhra wetlands is required to assess their status there. Similarly surveys are required in and around Keoladeo Ghana in the several satellite wetlands. In contrast the Eastern part of India (mainly West Bengal) conflict with fishing cats seems to be severe and villagers often kill it after snaring or trapping it. The other threat of habitat destruction due to brick mining and urbanisation seems to be a hopeless and lost case. Unless there is a political effort made to use land judiciously from an ecological perspective, these small pockets of populations will be soon lost.

### **7. Development of a conservation strategy for a newly discovered lion-tailed macaque *Macaca silenus* population in Sirsi-Honnavara, Western Ghats: II. Understanding the impact of NTFP collection on the lion-tailed macaques**

Principal Investigator	: Honnavalli N Kumara
Research Personnel	: K Santhosh
Duration	: 18 months
Date of Commencement	: August 2009
Date of Completion	: July 2011 (with extension)
Budget	: Rs. 606300/-
Funding source	: Critical Ecosystem Partnership Fund (CEPF) Small Grants



Recently identified lion-tailed macaque population in the forests of

Sirsi-Honnavara in southern Karnataka possibly represents the largest, contiguous population of the macaque in its natural habitat. However, conservation requires baseline information on various aspects more than just locating a population. The Sirsi-Honnavara forests harbour high density of people and a large extent of agricultural land. It is necessary to understand the interactions of people and the forest to properly manage the

area. To understand the impact of NTFP collection on the ecology of the lion-tailed macaques, studies on availability of forest produce and its use by monkeys and people has to be studied together. In the present study along with the ecology of lion-tailed macaques, 73 households in the home range of the study group have been monitored for the NTFP extraction.

### Objectives

- ✧ Study the impact of NTFP collection on feeding ecology of lion-tailed macaques,
- ✧ Assess the status of such food plant species,
- ✧ Develop a strategy for sustainable harvesting of NTFP's to the local forest managers.

### Research In brief

In the present study, we have found overlap in the resource use by monkeys and people. It is observed that more than 70 percent of the NTFP species are food species of LTM and the phenophases of plant species utilized by people and monkeys either overlap completely or use by one, makes the NTFP unavailable to the other, especially the macaque.

### Recommendations

In the region, collection of NTFP is legal and the rights for collection are auctioned by the forest department. We recommended developing an appropriate harvesting strategy and imposing ban on collection of certain NTFP's by people so that these food items of macaques are available to them at an optimum level. Department of Forests considered this recommendation and incorporated them in their current management plan for the area.



## 8. Assessment of occurrence and abundance of large mammals, birds and woody plants in Bannerghatta National Park, Karnataka

Principal Investigator	:	Honnavalli N Kumara
Project Period	:	Five Months
Date of Commencement	:	November 2010
Date of Completion	:	July 2011 (got extension)
Budget	:	Rs. 1.50/- Lakhs
Funding source	:	Karnataka Forest Department



Preparation of conservation action plan for any forest patch or protected areas require the basic information on the given ecosystem. This includes biodiversity, ecological and conservation status of important species, distribution pattern and identification of critical area for each important species, evaluation of threats and means for resolving or reducing them. While the Protected Area network is widely developed in the country, important baseline information is not available for many Protected Areas. Bannerghatta National Park is one such Protected Area that requires detailed documentation of above ecological information.

### Objectives

- ♦ Document the occurrence, distribution and abundance of mammals, birds and woody plants,
- ♦ Study the habitat correlates of mammal and bird distribution.

### Research In brief

Bannerghatta National Park lies between 12° 34´-12° 50´ N and 77° 31´-77° 38´ E, with an area of 104.27 sq km in the Bengaluru district. Dry deciduous forests and thorny scrub, with patches of moist deciduous forests along the streams, mostly cover the

park. The park considered as western tip of Eastern Ghats, can be expected to have several Eastern Ghats elements of fauna and flora. The current survey documented sizeable populations of various species of woody plants, birds and mammals in the Park.

Irrespective of the forest type, the increase in Lantana density is correlated with the decline in canopy and insectivores birds. Further, dense thickets of Lantana in the understory alter the structure of the forest and birds are one of the taxa that are mostly affected. Apart from the firewood collection and domestic hunting by local people, sand mining and land conversion for developmental activities around the park are very widespread.

### Recommendations

Mining around the periphery of the forest and other illegal activities hamper the bird movements and reduces the roosting sites of many raptors that prefer rocky outcrops.

If sand mining and related activities persist around the park, reestablishment of many species is difficult or they may continue to fall in number. Conservation and management should focus on the habitat protection and the animals.



## 9. Biodiversity assessment for environmental monitoring of medium/minor irrigation schemes all over Andhra Pradesh

Principal Investigator	: S N Prasad
Co-investigator/ Consultant	: Chiranjibi Pattanaik
Research Fellow	: G Yadagiri, B Narendar Y V B Charan
Project Period	: One year
Date of Commencement	: December 2010
Expected date of completion	: December 2011
Budget	: Rs. 14.66/- Lakhs
Funding source	: Irrigation and CAD Department, Govt. of Andhra Pradesh
Status	: On going
Collaborating Agency	: Irrigation and CAD Department

The irrigation and CAD department of Andhra Pradesh Government has taken up biodiversity assessment of about 100 irrigation schemes and the job was entrusted to SACON

### Objectives

The present work was undertaken to

- ❖ Carry out a biodiversity survey in the selected wetland area,
- ❖ Survey water spread area, foreshore area and command area of minor irrigation tanks and medium irrigation projects.

### Research In brief

The project has so far covered 20 wetlands in 4 districts. The available flora and fauna are documented. The study of biodiversity in selected wetlands of other districts is progressing.



Overview of Mushi reservoir



Overview of Kurunuthala tank, Guntur district



Overview of Madharam tank, Nalgonda district



## 10. Applications of free and open source geospatial tools for Environmental Conservation at Bhavanapadu Thermal power plant, Srikakulam district, Andhra Pradesh

Principal Investigator	: S N Prasad
Research Fellow	: Ch. Siva Krishna (funded by ECEPL)
Project Period	: May 2010 to April 2011
Date of Commencement	: 1 <sup>st</sup> May 2010
Expected date of completion	: August 2011
Budget	: Rs 3.44/- Lakhs
Funding source	: East Coast Energy Pvt. Ltd., Hyderabad
Status	: On going
Collaborating Agency	: East Coast Energy Pvt. Ltd., Hyderabad

The Bhavanapadu Thermal Power Plant has proposed an environmental conservation plan in Srikakulam district and this study was made upon their request to provide FOSS based inputs.

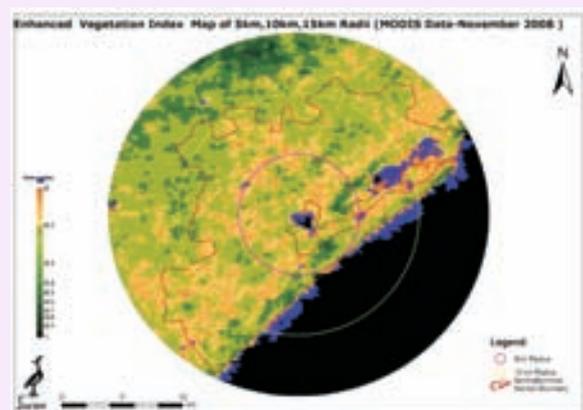
### Objectives

- ❖ Develop a geospatial framework for integration of the ongoing studies on flora and fauna, marine and coastal habitat assessment and socioeconomic studies,
- ❖ Deploy appropriate open source geospatial tools to capture, store and analyze the data and information and
- ❖ Enable capacity building of the project personnel to routinely employ the geospatial approaches in their respective fields of work.

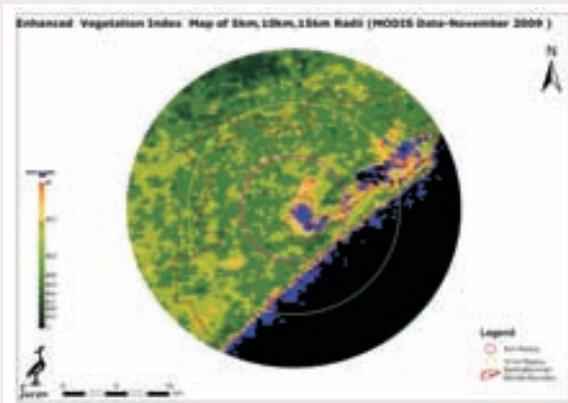
### Research In brief

The conservation cell of the Bhavanapadu Thermal power project has identified three major components of study to comply with the MoEF

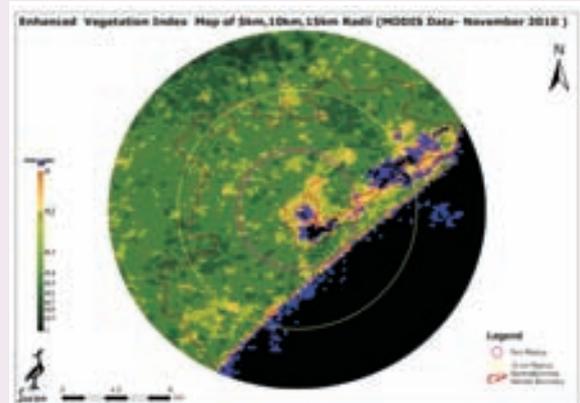
guidelines and to evolve best practices in conservation, vis-a-vis the power plant. These are i) study on the flora and fauna of the terrestrial ecosystems including the inland wetlands, ii) bench mark study on coastal and marine components of the project and surroundings, and iii) socioeconomic study of the human populations vis-a-vis resource dependency. The present work that attempts providing them software solutions in progress.



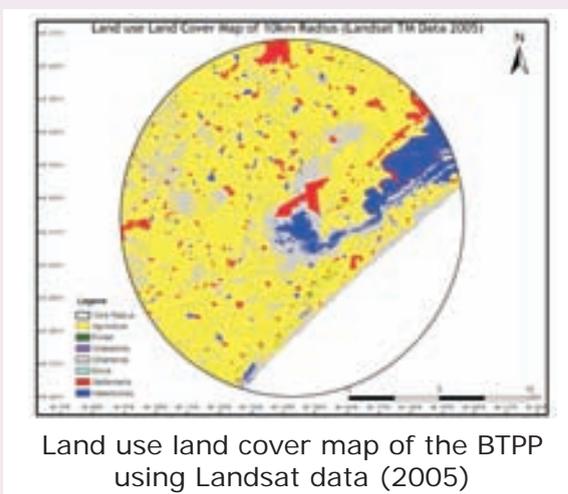
EVI of the BTPP using MODIS data (2008)



EVI of the BTPP using MODIS data (2009)



EVI of the BTPP using MODIS data (2010)



Land use land cover map of the BTPP using Landsat data (2005)



Villages covered within 10 km radius from the BTPP location

## 11. Coastal wetland mapping of Kerala

Principal Investigator	: S N Prasad
Research Personnel	: K S R C Murthy
Duration	: Nov 2010 to Aug 2011
Date of Commencement	: August 2010
Date of completion	: June 2011
Budget	: Rs 3.28/- Lakhs
Funding source	: KSBB
Status	: On going
Collaborating Agency	: KSBB, Trivandrum

This study is a part of the ongoing exercise by the Kerala Biodiversity Board to document the wetlands of Kerala.

### Objectives

- ◆ Delineate coastal wetland features like beach, back water, mangrove, coastal pond, ditches, swamps, sand and saltpan using



high resolution remote sensing data.

### Research in brief

The Google earth images are downloaded for the entire coastal regions of the Kerala state. Visual interpretation technique is followed and the overall coastal wetland

features such as lake, sand, beach, back water, river, tank, water logged area and low land area have been delineated. Coastal wetlands are masked out district-wise and the statistics were generated. A total of 66568.2 ha coastal wetland area are delineated in 9 districts of Kerala.

## 12. Land use and land cover dynamics and impact of human dimension in Indian river basin

Principal Investigator	: S N Prasad
Research Personnel	: N Ravi Kumar
Date of Commencement	: June 2009
Date of completion	: June 2011
Budget	: Rs 6.00/- Lakhs
Funding source	: NRSC, Hyderabad
Status	: On going
Collaborating Agency	: NRSC, Hyderabad

Remote sensing offers immense potentials for direct observations and quantitative assessment of land cover change at different spatial and temporal scales. Geographic Information System (GIS) has made it possible to develop quantitative analysis of spatial relationships associated with land use/ land cover changes. Linking observations at a range of spatial and temporal scales to empirical models provide a comprehensive approach to understand land cover change and at the same time provides important inputs to policy making. In this context, the present study aims at documenting the land use and land cover dynamics in entire river basins of India during the last 30 years.

### Objectives

- ♦ Generate land use/ land cover database with uniform

classification scheme for 1984-85, 1994-95 and 2004-05 using satellite data at 1:250,000 scale,

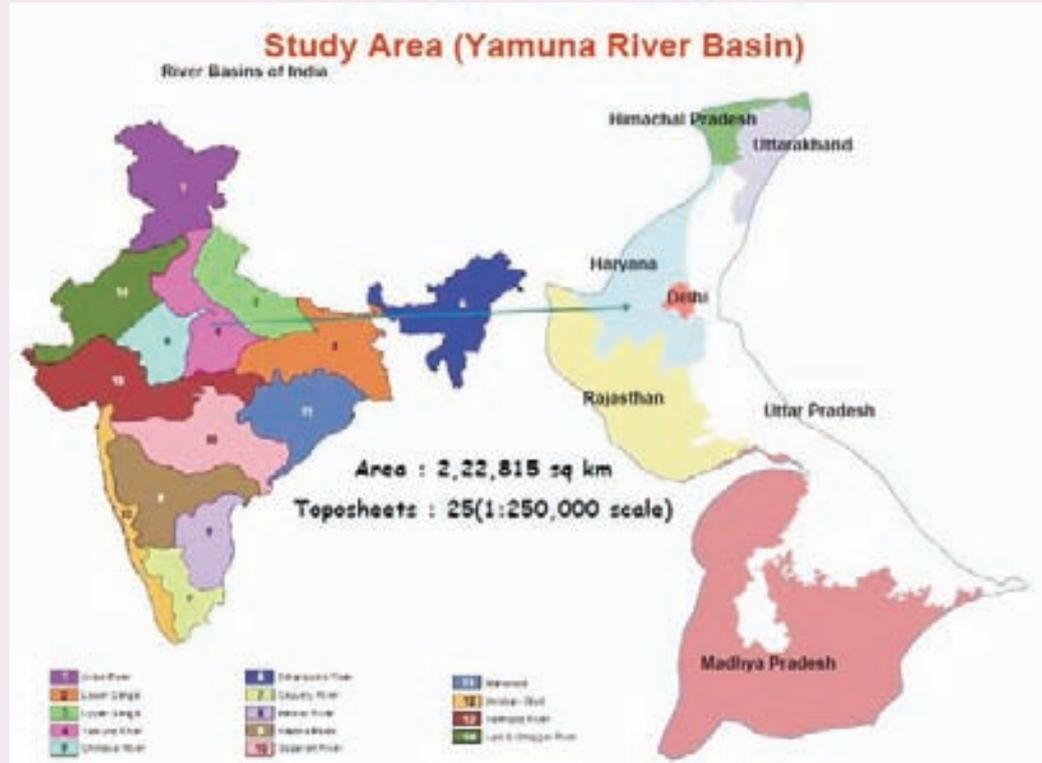
- ♦ Analysis of indicators and drivers and impact of human dimension on land use land cover dynamics and
- ♦ Project future land use/ land cover scenarios using appropriate models.

### Research in brief

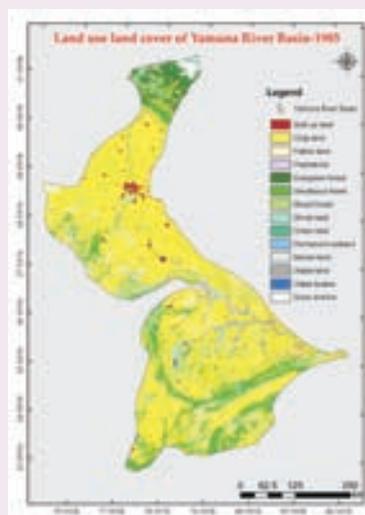
The present project across India is undertaken by ISRO to address the concern on land use change, human vulnerability and environmental change at river basin level. The land use land cover change maps were done for all the states (IRS 1A LISS I data of 1994-95) using 2005 vector layer provided by NRSC. The mapping of all states using Landsat MSS (1984-85) is also completed. Census data of 1981,

1991 and 2001 has been processed and density/km<sup>2</sup> was calculated upto district and tehsil level. Population for the years of 1985, 1995 and 2005 are calculated using the decadal growth rate. The classified maps and population data will help to compare the past and present status and also to predict the future scenario. Rainfall

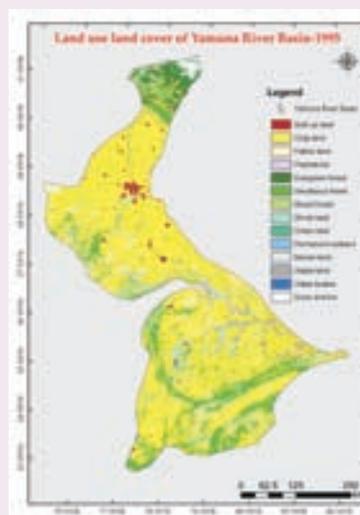
data has been processed in 1 sq km grids and the mean value was taken for the analysis. The temperature data has been interpolated from 1 degree raster data to 1 sq km grid for the Yamuna basin. Elevation data (SRTM 90m) also processed to 1 sq km grid for the whole basin.



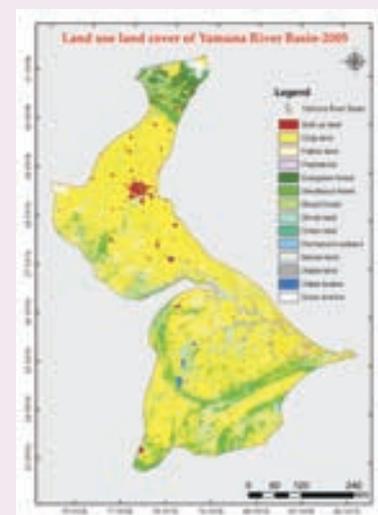
Land use land cover map of Yamuna River Basin



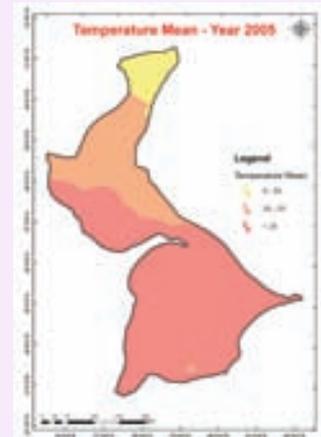
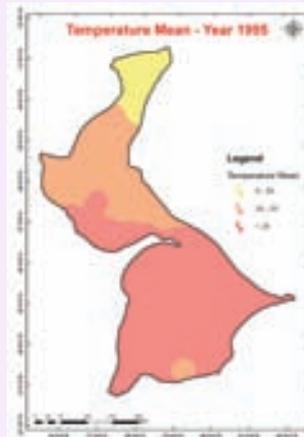
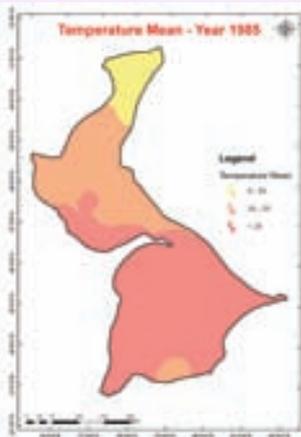
Year 1985



Year 1995



Year 2005



### 13. Assessing levels of Ecological Sensitivity of Western Ghats

Principal Investigator	: S N Prasad
Research Personnel	: Santosh Gaikwad Ch Appalachari
Duration	: October 2010 to June 2011
Date of Commencement	: October 2010
Date of completion	: June 2011
Budget	: Rs 10.56/- Lakhs
Funding source	: Ministry of Environment & Forests (MoEF)
Status	: Completed
Collaborating Agencies	: Care Earth (Chennai), UAS (Bengaluru)

The MoEF constituted the Western Ghats Ecology Expert panel (WGEEP) chaired by Prof. M Gadgil to recommend measures and to help delineate Ecological Sensitive Areas (ESAs) in the Western Ghats in a Geographic Information System (GIS) framework. This work was done on the request of the expert committee.

#### Objectives

- ✧ Assess levels of ecological sensitivity of different regions of the Western Ghats using geospatial approach, and
- ✧ Help build a decentralized open source geospatial framework with a possibility of local language support and open source data

#### Research in brief

Since the identification of ESAs

has to be based on a plethora of factors, integration of the information and data is a prime requisite. Modern methods of geospatial approach are eminently suitable for the purpose. This was attempted both in desktop and web enabled environment. The data used in these analyses comprises of seven physical, biological variables. A grid of 5'x5' was used to characterize relative combined significance of the locations. The grids were ranked from a low of 1 to high of 10. A vast number of grids of over 2000 for the entire Western Ghats have low scores, obviously due to cumulative anthropogenic impacts. Since the available data is primarily on forests, and forest related variables, a number of significant localities outside this configuration have not been taken into consideration. Thus, a number of IBAs would fall in grids with low scores.

## 14. Monitoring of pesticide residues in select components of an agro-ecosystem adopting organic and chemical farming in Padayetti village, Palakkad District, Kerala

Principal Investigator	: S Muralidharan
Research Personnel	: K Ganesan
Duration	: Three Years
Date of Commencement	: 17 <sup>th</sup> May 2009
Expect date of Completion	: May 2012
Budget	: Rs. 15.45/- Lakhs
Funding Source	: Environmental Management Agency, Govt. of Kerala
Status	: Ongoing

In our country problems resulting from improper use of pesticides is quite alarming. It is evident that our ecosystems are contaminated and require remediation. Practically, in this country there is no agricultural produce or ecosystem component, which is free from chemical residues. This project is part of a major initiative of Kerala State Biodiversity Board to restore the biodiversity of agro-ecosystem by totally avoiding chemical inputs.

### Objective

- ♦ Monitor pesticide residues in select components of an agro-ecosystem adopting organic and chemical farming.

### Research in brief

The present study monitors the residue levels of persistent chemical contaminants in sediment, crab, mollusc, fish, frog, agricultural produces (rice and fodder), cow-milk and select species of resident birds (on



an opportunistic basis) in organic and chemical farming in Padayetti village, Palakkad district, Kerala. Questionnaire survey was also conducted among farmers to know the chemical pesticides and fertilizers used. Forty-nine out of 69 farmers in the village are cultivating paddy. Study on bird population and Arthropod communities (insects and spiders), abundance and their changing pattern in paddy habitat are being studied to know how organic farming supports biodiversity.

Around 30 farmers are practicing organic farming. A few farmers have adopted convenient farming. Between the farms, organic farming areas attracted more number of birds, insects and spiders than the conventional farming. Varying levels of  $\Sigma$ -HCH ( $\alpha$ ,  $\beta$ ,  $\delta$  and lindane or  $\gamma$ -HCH),  $\Sigma$ -DDT (p-p'-DDT, p-p'-DDE, p-p'-DDD) and cyclodiene insecticides such as  $\Sigma$ -Endosulfan ( $\alpha$ ,  $\beta$ -endosulfan and endosulfan sulfate), heptachlor epoxide and dieldrin were detected in all the components. Pesticide residues detected were more in the samples collected from conventional than organic farming. Among HCH isomers,  $\beta$ -HCH was the most predominant (>60%). Among the various metabolites of DDT, p,p'-DDT contributed the most (>55%). Concentration of endosulfan was more than 50% of the total cyclodiene load.



## 15. Monitoring and Surveillance of Environmental Contaminants in birds in India

Project Investigator	: S Muralidharan
Project Peronnel	: S Jayakumar and N Saravana Perumal
Duration	: Three Years
Date of Commencement	: March 2010
Expected date of completion	: March 2013
Budget	: Rs. 48.36/- Lakhs
Funding Source	: MoEF, Govt. of India
Status	: Ongoing

In India, several species of birds, such as drongos, bee-eaters, baya, especially in agricultural lands have either disappeared in totality or their population has plummeted drastically. Some of the species which were "common" until recently have become rare and the reason is suspected to be environmental contamination. Sarus Crane, which lives in and around agriculture lands, has been a serious victim. Spot-billed Pelican and Grey-headed Fish Eagle are other notable species that are suspected to suffer due to contaminants. Therefore, there is a strong felt need to generate baseline information on the environmental residue levels of persistent pollutants through surveillance and monitoring and assess their impact on Indian avifauna.

### Objectives

- ♦ Monitor residue levels of persistent chemicals in birds and generate a database,
- ♦ Identify chemicals responsible for mass mortality of birds across the country,
- ♦ Assess the effectiveness of guidelines on usage of major chemical pesticides in the country.



### Research in brief

Between November 2010 and March 2011, 125 dead individuals belonging to 30 species of birds were collected. Among various organochlorine pesticide residues analyzed, total DDT showed the highest concentration followed by total HCH and total endosulfan. Higher levels of organochlorine pesticide residues were detected in the tissues of White-rumped Vulture followed by Painted Stork and Grey Heron, while tissues of Indian Peafowl had low levels. No significant difference was observed among tissues in their residue loads. Maximum was observed in liver followed by kidney, while the minimum was in brain. AChE and BChE activities levels in blood plasma were determined in 119 individuals from 30 species of birds.

## 16. Comprehensive Management Action Plan for Oussudu Sanctuary, Puducherry

Investigators	: B. Anjan Kumar Prusty, PR Arun and S Bhupathy
Duration	: November 2010 – March 2011
Research Personnel	: M Murugesan, K P Kavitha (01 Dec – 31 Dec 2010) and Rachna Chandra
Funding agency	: Department of Forest and Wildlife, Puducherry
Status	: Draft Management Plan submitted



The Oussudu Lake is the most important fresh-water lake of Puducherry region. The lake situated near Oussudu village extends to Tamil Nadu and Puducherry. The total water spread of the lake, when full after the monsoons, is about 390 ha. The lake is a major wintering spot for a large number of migratory birds and is a rich source of fish. The lake has been declared as a bird sanctuary, the first one in Puducherry. The Department of Forest and Wildlife, Puducherry requested SACON to prepare a Comprehensive Management Action Plan for Conservation of the lake.

### Objectives

- ✧ Assess the state of environment in and around the lake,
- ✧ Examine the probable threats to the lake and its ecological environs,
- ✧ Develop a Comprehensive Management Action Plan for conservation of the lake and its surroundings.

### Research in brief

The draft management plan submitted to the Forest department in March 2011 emphasizes maintenance of the ecological integrity of the lake. For this purpose, it suggests certain interventions such as regulation of water level and fishing, control of vehicle movement, boating & automobile exhaust and pollution, boundary demarcation and control of encroachment, formation of mounds in the lake, formation of bridge and watch tower, walk-way improvement, ban of dumping of solid wastes on the lake embankments, control of weeds, nature education and interpretation centre etc.

# NATURE EDUCATION



## 17. Nature Education Activities for Coimbatore and neighborhoods

Scientist In-Charge : P Pramod

Creating awareness on nature and natural resource conservation among the masses is one of SACON's mandates. To achieve this, the center has been working independently as well as in collaboration with government bodies, likeminded institutions and organizations.

### Objective

- ❖ Plan and execute programmes to inculcate nature awareness in the public with special emphasis on school children.

### Activities in brief

SACON has been using its campus for regular environment awareness activities. Nature Education programmes at SACON campus includes lectures, one-day nature camps for school and college students,

and celebrations. Other such programmes include training camps for teachers, seminars and exhibition on wildlife related themes conducted in association with several partners and collaborating organizations and annual Salim Ali Nature Competitions.

As part of our regular support to training forest officials, in-service trainees from CASFOS visits SACON for exposure to conservation science and the works of SACON. During 2010-11 three such batches visited SACON and interacted with the faculty.

A couple of refresher course batches from Bharathiar University and Avinashilingam University visited SACON for exposure to the research work and conservation science.

In addition out of campus programs for thousands of school and college students and nature lovers are

conducted in Coimbatore and neighbouring Tirupur districts. The events organized during 2010-11 are given below.

Schools from Coimbatore & Tirupur districts	19 nature camps, participants -1360
Colleges	14 nature camps, Participants - 526
one day Vacation camp (in association with Siruthuli)	100 students + 20 volunteers
Nature camp for disabled students	100 students + 40 volunteers
College Faculty	3 Programmes, participants - 126
Forests officials	3 Programmes, participants - 90

Coimbatore Vizha (2<sup>nd</sup> to 9<sup>th</sup> January 2011) is the festival of Coimbatore celebrated jointly by governmental, nongovernmental, cultural and civil society organizations during the first week of January every year since 2007. This year SACON mobilized people for discussions, debates and field level activities towards nature conservation education. As part of Vizha SACON conducted **Sálim Ali Nature Festival** in collaboration with sister organizations such as CASFOS and IFGTB, and voluntary groups such as Sálim Ali Naturalist Forum, Environment Conservation Group, Young Indians of CII, Outreach Foundation, OSAI and Tulasi Trust.

A Nature Photography Exhibition, Competition and Seminar was conducted (3<sup>rd</sup> to 9<sup>th</sup> January 2011) in the Vanavatika Hall of the Forest campus in collaboration with Central Academy of State Forest Services (CASFOS), and the Environment Conservation Group, an NGO from Coimbatore. Three veteran wildlife photographers viz. Shri TNA Perumal, Mr K Jayaram and Mr Maruthachalam were honored with lifetime

achievement award during the inaugural function. More than 500 photographs of 32 photographers were displayed during the program. More than four thousand wildlife and photography enthusiasts visited. One hundred and fifty photographs were displayed as entries. The prizes for the best were distributed during the concluding session on 9<sup>th</sup> January.

The **Seminar on Conservation Photography** conducted during these days had lectures by veterans in the field highlighting the techniques of wildlife photography and its links with conservation. On 3<sup>rd</sup> January Mr TNA Perumal delivered the lead talk followed by Mr Jayaram. Dr Tolstoy and Mr Kandasamy spoke on 9<sup>th</sup> January. On the 5<sup>th</sup> January a special **one day nature camp** for rural school students was arranged in collaboration with Thulasi Trust and Outreach Foundation, in which 50 students from 10 schools attended. On the 6<sup>th</sup> of January, a **one-day trek** was conducted for nature lovers of Coimbatore in Anaikatty Hills in collaboration with Yi of CII. Forty individuals participated in the trek.

In the annual Sálim Ali Trophy



Nature Awareness interschool competitions this year 1100 students from 61 schools participated. One hundred and twenty five students from 23 schools won the prizes. Konguvellalar Mat Hr Sec School, Karumathampatti bagged the coveted Rolling **Sálim Ali Trophy** for the best school for overall performance. The previous year's champions G D Mat Hr Sec School, Coimbatore and Kadri Mills Hr Sec School won second and third positions.

Sálim Ali Birth Anniversary Celebrations 2010: The 114<sup>th</sup> birth anniversary of late Dr Salim Ali was celebrated on 12<sup>th</sup> November. A **seminar on status and ecological condition of Coimbatore wetlands** was conducted. Inaugurating the seminar, the chief guest Mr P Umanath, IAS, District Collector highlighted the indifference of both state and society towards these water bodies. Scientists and environmentalists from seven organizations delivered lectures in the session. The seminar brought many NGOs and people concerned with conservation of wetlands together for discussion and dissemination of the ideas.

Sálim Ali Naturalist Forum: The Sálim Ali Naturalist Forum, a platform for nature education, initiated and technically supported by SACON, during 2010-11 conducted 15 programmes including trekking, bird watching and lectures on conservation issues.

Certificate Course in Ornithology: SACON started a Certificate Course on Ornithology coordinated by the Nature Education Division of the Centre. This course was

inaugurated on the 15<sup>th</sup> August 2010. In the first batch, 27 participants were admitted. The course is structured for 12 months, with twenty hours of lectures and twenty hours of fieldwork to be completed in the first six months. Participants will have to submit a field project work in July and the course will be completed in August.

HSBC Bird Race: SACON collaborated with HSBC Bank and Yuhina Eco-Media to organise the HSBC Bird Race in Coimbatore on 19<sup>th</sup> December 2010. The HSBC India Bird Race is a dawn-to-dusk event where a large gathering of experienced and budding birdwatchers spend an entire day sighting and identifying birds in an effort to record as many species of birds as possible. One hundred and five birdwatchers grouped into 20 teams, mostly nurtured through the nature education programme of SACON, participated in the event assisted by SACON scientists. There was good media coverage of the event including a live "phone in programme" by the local FM radio. Later in the evening all gathered for an interactive experience sharing session.

Synchronized Bird survey of Coimbatore Wetlands: SACON participated in the synchronized survey of wetland birds in Coimbatore coordinated across the state by Tamilnadu Forest Department. Under the guidance of SACON, on 12<sup>th</sup> January 2011 thirty trained Bird watchers associated with SACON as members of SANF looked for birds across 17 urban wetlands. They spotted 6000 birds belonging to 90 species during the first three hours of the day which included 41 species of true water birds and 49

species of wetland associated birds. Migratory birds like Spotbilled Pelican, Painted Stork were sighted.

**Nature Education programs in Kerala:** To celebrate the International year of Biodiversity, a collaborative project was initiated along with 'Kudumbasree' (Coordinated cooperative network of Neighborhood Help Groups in the state of Kerala), Idukki district. The first training for the resources persons was

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held in April and the second in July 2010. About 5-6 thousand students are expected to participate in the nature education programmes being organized in 52 gram panchayats and 8 block panchayats of Idukki district. 20 winners from these programs will visit SACON. They will also be taken for a three day nature camp in Silent valley and at SACON. Hundreds of teachers and Kudumbasree members are involved in this grass root level programme.

### 18. DNA clubs for Andaman Islands

Principal Investigator	: P Pramod
Assistance	: P Rajan, M Rekha (till January 2011)
Project period	: 2007-2012
Report Duration	: December 2010 to June 2011
Funding	: Rs 52.00/- Lakhs
Source	: Department of Biotechnology, Government of India

The program forms a part of 'DBTs Natural resources Awareness Clubs for School Children–The DNA Clubs' an initiative of the National Bio-resource Development Board, Department of Biotechnology, Government of India.

#### Objective

Promote deeper awareness among school going students about the importance of our environment, biodiversity, biotechnology and the relation of all these with everyday life.

#### Activities in brief

SACON has selected 10 schools across the Andaman and Nicobar Islands for the programme, where it has been successfully conducted for the last 4 years.

#### Activities in the participating schools

**DNA Festival 2010:** The DNA festival was organized from 21 to 23 November, 2010 for selected members from the DNA club member schools at Port Blair. The venue was Youth Hostel and Tagore College of Education in Port Blair. 100 participants from 8 schools participated after a rigorous selection process in the respective schools. Inter school competitions in quiz, painting, poster making, exhibition, model making, and debate were conducted and prizes distributed. An exhibition which showcased the DNA club activities in the schools was also organized. Shri SS Choudhary, (Principal Secretary to the A&N government) was the Chief Guest and Dr R Dev Das, (Director of Education, A&N Islands) was the Guest of Honour.



### **Vacation Training Programme on Bioresources 2010:**

This Training Course is aimed at students of DNA club member schools who have recently appeared in their X Class examination and are awaiting results. This year, 18 day long (from 19<sup>th</sup> May to 6<sup>th</sup> June) residential programme was conducted and the venue was Krishi Vigyan Kendra (KVK), Sippighat, Port Blair. Three students from each school were

selected and in total twenty-two students participated in the programme. The Vacation Training Programme was inaugurated by the Principal Chief Conservator of Forests of A&N Islands Shri SS Chaudhary IFS on 20<sup>th</sup> May 2010 in the presence of Dr PA Azeez (Director, SACON) and Dr RC Srivastava (Director, CARI, A&N Islands).

<b>Programme</b>	<b>Frequency</b>	<b>No. of schools</b>	<b>Topic</b>	<b>Remarks</b>
Invited lectures	60	09	Biodiversity and conservation in Andaman	–
Field visits	30	10	Local biodiversity	–
Laboratory demonstrations, experiments and hands on activities	60	10	--	–
Audiovisual programmes	40	–	–	Members of DNA club
Monthly meeting	120	10	--	–
Student Project	30	10	Local Biodiversity	–
Competitions	10	10	Poster making and quiz, preparation of herbarium, and painting	--

The activities started every day with a nature walk along with the experts on birds, butterflies, other insects, plants, etc. The participants collected field level information through systematic observation with the help of experts. They pooled these data under four major subjects; plants, birds, insects and agriculture. Twenty-two scientists from sixteen institutions from the island and mainland participated

and gave lectures during the program. The activities in the VTP Camp also included institutional visits, competitions, equipment demonstrations and screening films. Valedictory session was held on June 5<sup>th</sup>, the World Environment Day.

## OTHER ACTIVITIES

### Monitoring and Evaluation of Loktak Lake Management Project : Wetland Ecology Component



The Water Institute, Karunya University entered into a Technical Service Contract with SACON to evaluate the Wetland Ecology component of the project "Monitoring and Evaluation of Loktak Lake Management" being implemented by the Loktak Development Authority (LDA), Manipur.

#### Objectives

- ✧ Assess the status of water bird monitoring studies being undertaken by the Forest Department-Wildlife Wing, Manipur,
- ✧ Evaluate the project being implemented by the LDA, Manipu.

#### Research in brief

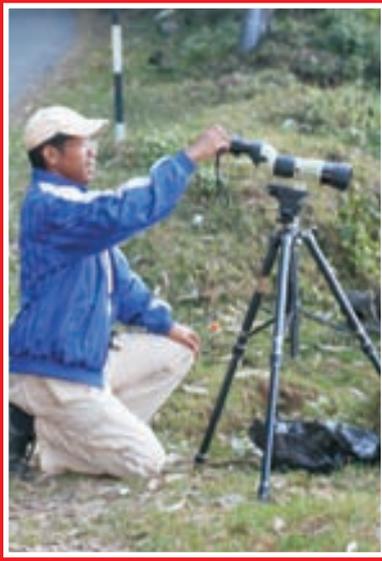
SACON has evaluated the water bird monitoring studies undertaken by the Forest Department-Wildlife Wing, Manipur. We have provided suggestions and recommendations, on both research and management components, to enhance the effectiveness of project implementation. Dr P Balasubramanian, Principal Scientist carried out the work on behalf of SACON.

### Endosulfan persistence in Kasargod and its impacts on human health and environment

Endosulfan, an organochlorine pesticide was extensively sprayed aerially for 20 years from 1980 and 2000 to ostensibly control tea-mosquitoes and a variety of pests in cashew estates owned by Plantation Corporation of Kerala (PCK). Endosulfan, which is not easily degradable, contaminated the soil and water, apparently found its way into the food chain affecting life in the area including that of humans. Several reports claim that endosulfan was the prime reason for various kinds of diseases and disorders seen among the people residing nearby. Kerala State Council for Science, Technology and Environment constituted a Technical Cell to assess the endosulfan persistence in Kasargod. In this background, this project was launched supported by KSCSTE to document residue levels of endosulfan in water (pond, stream, ground and bore well), sediment and soil. The study is in progress, sample collections are being conducted.

Dr S Muralidharan, Principal Scientist is conducting the investigation along with his team in the Ecotoxicology Division.

## CV Raman International Fellowship



Dr H F Rakotomanana from University of Anatananarivo, Madagascar worked “An overview of Common Myna, *Acridotheres tristis* in its native and non-native range distributions: India and Madagascar” at SACON. The host scientist was Dr P Balasubramanian, Principal Scientist, Landscape Ecology. Common Myna behaves in a similar way in the two different geographic ranges. In India, it is an omnivore but mainly feeding on fruits and grains. In Madagascar, this introduced species is an opportunistic omnivore feeding on a wide variety of foods. Its expansion has been rapid and extensive in different parts of Madagascar from eastern to western sides, spreading across

both urban and suburban areas. It predaes eggs and small vertebrates, and is aggressive to native species competing for foods and other resources.

Dr Rakotomanana worked at SACON as a recipient of senior fellowship from Federation of Indian Chamber of Commerce and Industry (FICCI) under C V Raman International Fellowship for African Researchers. The purpose of this fellowship was to exchange ideas and information with the host scientist and team. A review on common myna, a species that is found both in India and Madagascar was prepared during this fellowship.



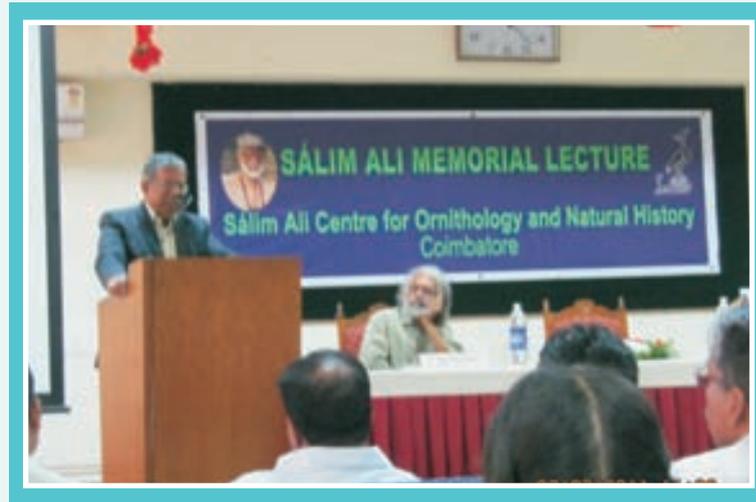
## WORKSHOPS, SEMINARS, SYMPOSIUMS, CONFERENCES AND TRAINING PROGRAMS



Padma Bhushan Dr Ramachandra Guha, the renowned writer and historian delivered the Sálim Ali Memorial Lecture 2010-11. In the function organized by SACON at CASFOS, Coimbatore on 2<sup>nd</sup> March 2011, he talked on 'Ecological town planning In India – the forgotten yet relevant legacy of Patrick Geddes'. Sir Patrick Geddes (1854 - 1932) was a Scottish biologist, sociologist, philanthropist and pioneering town planner. He is known for his innovative thinking in the fields of urban planning and education. He was responsible for introducing the concept of "region" to architecture and planning and is known to have coined the term "conurbation".

In his scholarly address, Dr Guha stated that town planners in every city in India should take inspiration from Patrick Geddes. "Geddes's words

should be pasted above the office desks of planners working today in Chennai, Hyderabad and a dozen other cities of India" Dr. Guha emphasized. There were three central themes to Geddes' town plans — respect for nature, democracy and tradition. His town plans were ecological. He saw Indian city as defined by its relation to water. Traditional India considered rivers sacred, which he called the fundamental and central river-factor of human environmentalists. Wherever there were no rivers, he stressed the renewal and revitalization of tanks. Geddes was also alert to space, however small. As a skilled botanist, he had a keen eye for appropriate species. His plans were filled with meticulously specific recommendations. Geddes stressed the conservation of resources, to minimize the city's dependence on



the hinterland. Particularly noteworthy was what he said about wells. These, Geddes says, should be regarded as a valuable reserve to the existing water supplies, even more efficient. Any and every water system occasionally goes out of order, and is open to accidents and injuries of very many kinds; and in these old wells we inherit an ancient policy, of life insurance, of a very real kind, and one far too valuable to be abandoned."

According to Dr Guha the town planner also emphasizes the importance of recycling. Sewage could be fruitfully used to manure gardens, converting a fetid and poisonous nuisance into a scene of order and beauty. This might even lead to an elevation in the status of the sweepers, who would be put in charge of using night-soil to raise and cultivate gardens.

The second theme of Geddes was respect for democracy. Dr Guha said: "As the physician must make a diagnosis of the patients' case before prescribing treatment, so with the planner for the city. The democratic town planner must pay special attention to the needs of the less-

privileged groups. He stressed on the rights and needs of women and children, which tend to be ignored in most plans. Dr Guha added that another aspect of Geddes' democratic instincts was his opposition to the mindless destruction of buildings to improve the town or to build highways for cars to drive through.

This logically led to the respect for tradition, or Geddes' awareness of what was now called heritage conservation. He offered a five-word motto that those interested in heritage preservation must impress upon every architect and town planner that "To postpone is to conserve".

Summing up, Dr Guha said Geddes drew a distinction between what he called the Paleotechnic present and a Neotechnic future. The former was the dominance of man by machine, finance and militarism. But Geddes hoped for a new, Neotechnic age based on solar energy and on long-lasting alloys, marked by better use of resources towards betterment of man and his environment together.

Dr Paul P Appasamy, Vice Chancellor, Karunya University, Coimbatore delivered the presidential

address. Dr N Krishnakumar, Director, IFGTB, Coimbatore; Dr E J James, Director, Water Institute, Karunya University, Faculty of Central Academy of Forest Services, IFGTB, wildlife enthusiasts and dignitaries from different walks of life graced the occasion. Dr P A Azeez, Director, SACON welcomed the gathering and Dr P Pramod, Senior Scientist-Nature Education, SACON offered the vote of thanks. The function was also marked by distribution of prizes to the winners of Sálim Ali Nature Competitions-2010.

### **DST-SERC School in Herpetology**

India as one of the mega-biodiversity countries holds several assemblages of unique flora and fauna. Information on the status, distribution and ecology of these are important for their conservation, sustainable use and management. Non-availability of well-trained personnel to undertake research and management works on our biota is a seriously felt need, and hence the Schools on various taxa/disciplines have been initiated by the Science and Engineering Research Council (SERC) of Department of Science and Technology (DST), Government of India.

The DST- SERC School in Herpetology was initiated in 2007, thanks to the efforts of Prof SK Dutta, Department of Zoology, North Orissa University, Baripada, Orissa. So far, four Schools have been conducted, and about 100 researchers, including a few representatives from SAARC nations, were trained. In each School, several leading National and International experts on the subject teach the participants on various aspects of Herpetology. The activities of the School including scheduling, structuring, monitoring and reviewing are monitored by a Planning Committee constituted by the DST.

The 4<sup>th</sup> School in the series was conducted at the SACON during 24<sup>th</sup> January to 7<sup>th</sup> February 2011. Earlier schools were organized at North Orissa University (Orissa), Wildlife Institute of India (Dehra Dun) and Arya Vidhyapeeth College (Guwahati). For the school at SACON, 78 applications from 36 institutions from various states of India and one from abroad were received. The Planning (Selection) Committee selected 23 candidates (14 men, 9 women) representing 15 states. Seven core and 11 guests invited faculties, including two from abroad





(David Cannatella, USA, and Ansem de Silva, Sri Lanka) took classes. This two-week programme was divided into five modules; Systematics & Biogeography, Ecology & Behaviour, Reproductive & Developmental Biology, Conservation & Management and Scientific Communication. Each module had at least one field or laboratory practical. Field training programmes included sampling techniques, density and occupancy estimations organized in Anamalai Tiger Reserve and Anaikatti Forests. Laboratory sessions covered preservation of specimens, taxonomy, tadpole morphology, skeletal structure of amphibians and photography. Hands on training in research proposal preparation and appraisal of research papers were also included. The course performance was assessed by

participants through feedback forms and students by a written test.

The course was inaugurated on 24<sup>th</sup> January 2011 by Mr B Vijayaraghavan, IAS (Retd), Chairman, Chennai Snake Park Trust, Chennai in the presence of Prof SK Dutta, Head, Department of Zoology, North Orissa University, Baripada, Orissa (& Director, DST-SERC School in Herpetology), Mr Doyil T Vengayil, Scientist, DST, Dr P A Azeez, Director, SACon, participants and representatives from various research organizations in Coimbatore. The valedictory function, organized on 7<sup>th</sup> February 2011 was presided over by Dr N Krishna Kumar IFS, Director, IFGTB, Coimbatore.

## On Instrumentation & Analytical Techniques

Eleventh training program on "Instrumentation and Analytical Techniques" was organized between 16 and 20 August 2010 by the Ecotoxicology Division at SACon. Dr GP Jeyanthi, Professor and Head, Department of Biochemistry, Avinashilingam University for Women, Coimbatore inaugurated the programme. Thirty-five students from different disciplines (BTech, MSc, MPhil and PhD) from Arunai Eng College (Tiruvannamalai), K.S.R College of Arts and Science (Tiruchengodu), SRM University (Chennai) and SSM Polytechnic (Kumarapalayam) participated in the programme. Two officials from Coimbatore Corporation also participated. During the five-day-long programme,



trainees 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 Ultra Centrifuge.

# NEW ACADEMIC PROGRAMME

SACON entered into a Memorandum of Understanding with Indira Gandhi National Open University (IGNOU), New Delhi on 29 March 2011. The MoU envisages taking up joint programmes in the areas of Environmental Impact Assessment (EIA) and Management in distant mode. The programme will be offered at two levels, i.e. certificate (6 months) and Post Graduate diploma (12 months). The courses will cover various aspects related to EIA and Environmental Management with a view to provide the subject EIA its due academic credit. The course is being planned at a time, when there is a major boost in industrial growth in the country due to economic liberalization and globalization. Our development path essentially need to be streamlined to follow a sustainable path avoiding degradation of environmental quality and depletion of natural resources including the non-renewable ones which are finite in supply. In this juncture, the role of EIA to harmonize the development and bring about sustainability in the country need to be communicated to a larger segment of the society cutting across narrow disciplinary interests.

The MoU was signed by Dr PA Azeez (Director, SACON) and Mr US Toliya, (Registrar, Administration, IGNOU) in the presence of Dr Latha Pillai (Pro-Vice Chancellor, IGNOU). Present in the function, among others, were Directors of different schools and faculty members of IGNOU, Dr MK Salooja (Director, School of Agriculture), Mr Sharatchandra Khuman Yangleem (Program

Coordinator, Chair for Sustainable Development), and Dr B Anjan Kumar Prusty (Scientist, Division of Environmental Impact Assessment and Program Coordinator, SACON). Dr Pillai emphasized the need for such a program owing to the changing environmental scenario and the need for sustainable development, and cited examples of other academic institutions offering similar programme aiming at bringing sustainability in the environment. Dr Azeez briefed the house about SACON and its activities and involvement in research and extension, and outreach and the need for taking up such academic programs for human resource development in the field. He drew the attention of the house that the development in the country leading to the unsustainability in natural resources exploitation and the role of EIA as a tool for sustainable development in India. He emphasized the issue of lack of skilled personnel for undertaking environmental assessments. The courses are expected to be launched during mid 2012.

The aim of this programme is to initiate a course which is different than the conventional courses and pave the way to a full Post Graduate Degree course in future. The course is being designed for various target groups: students and researchers at different levels from university departments, institutions and colleges, staff from forest department, pollution control boards, other government departments, and personnel from corporate sector and non-governmental organizations. The



program will be run in distant mode (online) and is expected to be launched by June-July 2012. The course will provide the students / participants the theoretical background and practical

exposure (field survey techniques and laboratory analysis) on different aspects of EIA and Environmental Management. More importantly, these courses, would make the students aware of the critical issues related to EIA and EMS, and provide hand-on experience in reviewing the EIA reports, undertaking environmental auditing and/or accounting and contribute towards developing human resources in India helping towards its sustainable development and management of natural resources.

### **Dr K Kasturi Rangan, Honorable Member, Planning Board heads Planning Commission of funding & Team Visits SACON**

**Dr K Kasturi Rangan**, Member, Planning Commission and former Chairman of Indian Space Research Organization visited SACON on 6<sup>th</sup> March 2011. He was accompanied by Shri Ranjan Chatterjee, IAS, Senior Consultant (E&F), Dr Indrani Chandrasekhar, Senior Advisor and Dr Vandana Dwivedi, Advisor. The team interacted with the SACON faculty and research scholars showing keen interest in the conservation projects taken up by SACON in different parts of the country. They deeply appreciated the work carried out by SACON with élan and commitment.



## ACADEMIC PROGRAMMES

### ZOOLOGY

Name of the Research Guide	Name of Scholar	Degree	Title	Status
Dr Lalitha Vijayan	M A Rajamamannan	Ph D	Avifaunal diversity of the Andaman Islands.	Awarded
	N Sheeba	Ph D	Ecology and conservation of spot-billed pelican.	On going
Dr S Bhupathy	J Gokulakrishnan	PhD	Ecology of sea turtles along the Nagapattinam coast, Bay of Bengal.	On going
	G Srinivas	Ph D	Ecology of amphibians in high wavy mountains, Western Ghats.	On going
	N Sathish Kumar	Ph D	Ecology of reptiles in high wavy mountains, Western Ghats.	On going
	C Ramesh	Ph D	Ecology of the Indian python in Keoladeo National Park, Bharatpur.	On going
Dr P Pramod	L Josheph Reginald	Ph D	Diversity and habitat preference of bats (Order Chiroptera) of Coimbatore.	On going
	Chetan Nag	Ph D	Addressing the issue of taxonomic position of peninsular Indian Hanuman langurs ( <i>Semnopithecus entellus</i> ) through a multidisciplinary approach.	On going
	A P Zaibin	Ph D	Insular biogeography of Nicobar Islands from a bird community perspective.	On going
	P Rajan	Ph D	Ecology and distribution of two introduced bird species ( <i>Acridotheres tristis</i> and <i>Passer domesticus</i> ) in Andaman Islands.	On going
	K Priya	M Phil	Genetic diversity analysis of Andaman day gecko ( <i>Phelsuma andamanense</i> ) by DNA fingerprinting.	On going



## BOTANY

Dr P Balasubramanian	E Santhoshkumar	Ph D	Studies on frugivory and seed dispersal by Indian Grey Hornbill, <i>Ocyrceros birostris</i> in Sathyamangalam Forest Division, Eastern Ghats.	Awarded
	C Anbarasu	Ph D	Avian frugivory and seed dispersal in the shola forests of Nilgiris, Western Ghats, India.	On going
	R Aruna	Ph D	Frugivory and seed dispersal by birds in mixed dry deciduous and scrub forests.	On going
	P Nehru	Ph D	Floristic diversity, dynamics and recovery of littoral forests of Nicobar Islands, India- a post Tsunami scenario.	On going



**ENVIRONMENTAL SCIENCES**

Dr P A Azeez	PP Nikhil Raj	Ph D	An analysis of environmental changes in the Bharathapuzha River basin, Southern India.	Thesis submitted
	Rachna Chandra	Ph D	Nutrients and metals in soils and plants in Araku, AP, India.	Awarded
	J. Ranjini	Ph D	Adaptation and tolerance of birds to urbanization - a critical evaluation with emphasis on life strategy.	On going
	R Dhanya	Ph D	Urbanization and environmental transition: A study on the impact of developmental activities with special reference to EMR on the House Sparrows.	On going
Dr S Muralidharan	A Alaguraj	Ph D	Organic contaminants in the marine fishes available in Coimbatore and their suitability for human consumption	
	P Jayanthi	Ph D	Organochlorine pesticides residues in the commercial marine fishes of Coimbatore and their suitability for human consumption.	On going
	S Jayakumar	Ph D	Impact of agricultural pesticides on the population status and breeding success of select species of fish-eating birds in Tamil Nadu.	On going
	K Ganesan	Ph D	Comparative study on pesticide residues in select components of an agro ecosystem adopting organic and chemical farming in Padayetti village, Palakkad District, Kerala.	On going
	P Navamani	M Phil	Poly Cyclic Aromatic Hydrocarbon (PAHs) in marine fishes collected from Cochin and Rameshwaram coasts and their suitability for human consumption.	On going



## PUBLICATIONS

### I. Journals

#### National

Gunasekaran M and Balasubramanian P (2010). Taxonomic enumeration and economic values of Sthalavrikshas (Temple trees) in Tamil Nadu & Puducherry, Southern India. *Journal of Economic and taxonomic Botany*. 34 (4): 769-776.

Kumara H N, Singh M, Kumar S and Sinha A (2010). Distribution, abundance, group size and demography of dark-bellied bonnet macaque *Macaca radiata radiata* in Karnataka, South India. *Current Science*. 99: 663-667.

Kumara H N, and Singh M (2011). Distribution, status and conservation of primates of the Western Ghats. Commissioned papers / Western Ghats <http://www.westernghatsindia.org>.

Nagabhatla N, Sellamuthu S S, Bobba A G, Finlayson M, Wickermasuriya R, Brakel M V, Prasad S N and Chiranjibi Pattanaik (2011). Insight to ecosystem based approach (EBA) at landscape level using a geospatial medium. Accepted in *Journal of the Indian Society of Remote Sensing*.

Nehru P and Balasubramanian P (2010). Notes on the distribution of *Capparis grandiflora* Wall. Ex Hook.f. Thomson, an endemic shrub of peninsular India. *Indian Journal of Forestry*. 33(2): 271-272.

Pardeshi M and Prusty BAK (2010). Termites as ecosystem engineers and potentials for soil restoration. *Current Science*. 99(1): 11 (10 July 2010).

Prusty BAK (2011). A book review on "Climate Change and Chemicals: Environmental and Biological Aspects. Authroed by Golam Kibria, A. K. Yousuf Haroon, Dayanthi Nugegoda and Gavin Rose. *Current Science*. 100 (1): 121-122 (10 January 2011).

Radhakrishna S and Kumara H N (2010). Behavioural variation in the Mysore slender Loris *Loris lydekkerianus lydekkerianus*. *Current Science*. 99: 1226-1232.

Reddy C S, Shilpa babar, Giriraj A and Chiranjibi Pattanaik (2011). Structure and floristic composition of tree stand in tropical forest across altitudinal gradient in Eastern Ghats of Northern Andhra Pradesh, India. Accepted in *Journal of Forestry Research*.

Sheeba Nanjan and Lalitha Vijayan (2011). Sighting of the Lesser Adjutant *Leptoptilos javanicus* at Uppalapadu Heronry, Andhra Pradesh, India. *ZOO's PRINT*. Vol. XXVI, (7): 26.

#### International

Balasubramanian P, Santhoshkumar E and Anbarasu E (2011). Vegetation features and restoration initiatives in the Indian Grey Hornbill habitats in Sathyamangalam Wildlife Sanctuary, Eastern Ghats, India. *The Raffles Bulletin of Zoology*. (Supplement) 24: 53-57.

- Bhupathy S, Srinivas G, Sathish kumar N, Karthik T and Madhivanan A (2011). Herpetofaunal mortality due to vehicular traffic in the Western Ghats, India. A case study. *Herpetotropicos*. 5(2): 119-126.
- Bhupathy S and Buhlmann K A (2010). Le Trionyx à clapets de l'Inde *Lissemys punctata* (Bonnaterre, 1789): Indian Flapshell Turtle. *Chéloniens*. 18: 24-28.
- Chandra R and Prusty BAK (2010) A new record of a fish species, *Rasbora daniconius*, in the wetlands of Keoladeo National Park, Bharatpur, India, and conservation concerns. *Environmental Research Journal*. 4 (5-6): 01-17.
- Chandra R, Prusty BAK and Azeez PA (2011). A revised checklist of the flora of Keoladeo National Park, a world heritage site in India. *Environmental Research Journal*. 5 (2-3).
- Chandra R, Prusty BAK and Azeez PA (In press). Biomass and productivity assessment of plant community in a monsoonal wetland ecosystem. *Environmental Research Journal*.
- Chethan Nag K S, Pramod P and Karanth K P (2010). Taxonomic implementation of a field study of morphotypes of Hanuman Langurs (*Semnopithecus entellus*) in Peninsular India. *International Journal of Primatology*.
- Dhananjayan V and Muralidharan S (2010). Organochlorine pesticide residues in Inland fishes of Karnataka, India and the implication of human dietary intake. *Bulletin of Environmental Contamination and Toxicology*. DOI 10.1007/s00128-010-0122-x.
- Dhananjayan V, Muralidharan S and Jayanthi P (2010). Distribution of persistent Organochlorine chemical residues in blood plasma of three species of vultures from India. *Journal of Environmental Monitoring Assessment* DOI 10.1007/s10661-010-1424-5.
- Dhananjayan V and Muralidharan S (2010). Levels of Organochlorine Pesticide Residues in Blood Plasma of Various Species of Birds from India. *Bulletin of Environmental Contamination and Toxicology*. Vol. 85(2): 129-136.
- Gunasekaran M and Balasubramanian P (2010). Butterfly diversity and its conservation in temple premises of Tamil Nadu, Southern India, *International Journal of Biological Technology*. 1:1-5.
- Manchi S and Sankaran R (2010). Foraging habits and habitat requirements of the Edible-nest Swiftlet and the Glossy Swiftlet in the Andaman Islands. *Wilson Journal of Ornithology*. 122 (2): 259-272.
- Muralidharan S and Dhananjayan V (2010). Diclofenac residues in tissues and plasma of vultures collected from Ahmedabad, India. *Bulletin of Environmental Contamination and Toxicology* DOI 10.1007/s00128-010-0109-7.
- Prusty BAK, Chandra R and Azeez PA (2010). Macronutrients along the sediment core in a semitropical monsoonal wetland in India. *Wetlands Ecology and Management*. 18 (1): 91-105 (February 2010).



Prusty BAK, Chandra R, Shah Hussain M and Azeez PA (In Press). Annual recruitment pattern of fishes into Keoladeo National Park wetland system, India. Environmental Research Journal.

Ramesh C and Bhupathy S (2010). Breeding Biology of *Python molurus molurus* Linn. (1758) (Family: Boidae) in Keoladeo National Park, Bharatpur, India. Herpetological Journal. 20: 157-163.

Santhoshkumar E and Balasubramanian P (2010). Breeding behaviour and nest tree use by Indian Grey Hornbill *Ocyrceros birostris* in India. Forktail. 26: 82-85.

## **II. Papers in Conferences/seminar/proceedings/edited volumes**

### **National**

Charan YVB, Chiranjibi Pattanaik, Prasad S N and Manikya Reddy P (2010). Application of remote sensing and GIS in conservation of Pulicat wetland, Andhra Pradesh. Abstract in National seminar on GIS applications in Environmental Science and Geography, Swami Ramanand Teerth Marathwada University, 30<sup>th</sup> October, Nanded.

Ganesan K and Muralidharan S (2010). Pesticide contamination in selected species of frogs in an Agroecosystem in Kerala. National seminar on Tropical Ecosystems: Structure, Function and Services. 28 & 29 December 2010.

Jayakumar S, Muralidharan S and Dhananjayan V (2011). Status and Distribution of Heronries in Tamil Nadu. National Seminar on Emerging Trends in Conservation Science. 23 & 24 March 2010.

Jayakumar S, Muralidharan S and Dhananjayan V (2010). Population and breeding ecology of select species of birds in Thiruppudaimaruthur Heronry Tamil Nadu. National Seminar on Tropical Ecosystems. Structure, Function and Services. 28 & 29 December 2010.

Manchi S and Sankaran R (2010). Edible-nest Swiftlet: Conservation, economics and livelihood generation, published in the proceedings of the National Seminar on Tropical Ecosystems: Structure, Function and Services, 28 & 29 December 2010, Organized by Indian Council of Forestry Research and Education at Institute of Forest Genetics and Tree Breeding, Coimbatore.

Muralidharan S, Jayakumar S and Deepalakshmi K (2010). Heavy metal contamination in fishes from selected Bird Sanctuaries in Tamil Nadu. National seminar on Tropical Ecosystems: Structure, Function and Services. 28 & 29 December 2010.

Murugesan M, Chandra R, Kavitha K P, Prusty BAK and Arun PR (2010). Conservation value of Ousteri Lake, Puducherry, India: a wetland of international importance. Tropical Ecosystems: Structure, Function and Services. Institute of Forest Genetics and Tree Breeding, Coimbatore. 29- 30 December 2010.

- Nagabhatla N, Dhyani S, Sellamuttu S S, Max Finlayson, Wickramasuriya R and Chiranjibi Pattanaik 2010. A case study approach to demonstrate challenges in participatory environmental governance in multiple resource systems. Full paper for National seminar on Management of Natural Resources and Environment in India, 23-24 October, Guru Nanak Dev University, Amritsar.
- Narendar B, Chiranjibi Pattanaik, Prasad S N and Manikya Reddy P (2010). Monitoring mangrove cover in Devi river delta of Orissa through remote sensing and GIS. Abstract in Andhra Pradesh Science Congress, 18-20<sup>th</sup> November, JNTU, Hyderabad.
- Pattanaik Chiranjibi (2010). Conservation of wetland resources of Odisha: a remote sensing and GIS perspective. Invited lecture on 1<sup>st</sup> Odisha Environmental Congress, Regional Museum of Natural History, 22-24<sup>th</sup> December, Bhubaneswar.
- Pattanaik Chiranjibi, Reddy C S, Murthy MSR and Manikya Reddy P (2010). Biodiversity characterization at landscape level in Eastern Ghats of Orissa, India using remote sensing and GIS. Abstract in National Conference on New Frontiers in Life Sciences, Regional Museum of Natural History, 9-11<sup>th</sup> December, Bhubaneswar.
- Pattanaik Chiranjibi, Murthy KSRC and Prasad S N (2010). Monitoring the habitat of Jerdon's courser: a critically endangered bird using remote sensing and GIS. Abstract in National symposium on Deccan Biodiversity, Osmania University, 2-3<sup>rd</sup> December, Hyderabad, p-28.
- Pattanaik Chiranjibi and Narendra Prasad S (2010). Climate change and wetlands: the impact, mitigation and adaptation. Abstract in National Seminar on Climate Change and its impact on water resources, University of Hyderabad, 8-9<sup>th</sup> November, Hyderabad, p-58.
- Pattanaik Chiranjibi, Prasad SN and Manikya Reddy P (2010). Disappearing plant wealth of Mahendragiri hill range: conservation through using advanced geospatial technology. Abstract in National Conference on plant diversity: Prospects and problems of conservation, Kristu Jayanti College, 27-29<sup>th</sup> October, Bangalore.
- Pattanaik Chiranjibi, Rashmita Das and Manikya Reddy P (2010). Conservation of medicinal plant resources of Deomali hill range, Orissa: A Remote Sensing Approach. Abstract in National Conference on Herbal Medicine, Bharathiar University, 8-9<sup>th</sup> September, Coimbatore, p-146.
- Prasad S N, Chiranjibi Pattanaik and Gaikwad S (2010). Wetlands of India –Status and a Web GIS for Kerala. Invited lecture in LAKE 2010, IISc, 22-24 December, Bangalore.
- Prasad S N, Gaikwad S and Chiranjibi Pattanaik (2010). Applications of Free and Open Source GIS Tools in Environmental Conservation and In Civil Governance. Invited lecture in National Convention for Academics and Research (NCAR) 2010, IIIT Hyderabad, 16-18 December 2010.



Prusty BAK and Chandra R (2010). Ecological and Social dimensions of *Prosopis juliflora* in drylands of Western India: Management Challenges. Tropical Ecosystems: Structure, Function and Services. Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore. 29 & 30 December, 2010.

Saravana Perumal N, Muralidharan S, Murali Manohar B, Vijayabharathi V and Jayakumar S (2011). An incidence of disease outbreak at Nalabana Bird Sanctuary, Chilika Lake, Orissa. National Seminar on Emerging Trends in Conservation Science. 23 & 24 March 2010.

Yadgiri G, Chiranjibi Pattanaik, Prasad SN and Manikya Reddy P (2010). Application of geoinformatics in conservation of forest resources: a case study in Gandhamardan hill range of Orissa. Abstract in National Seminar on Application of geoinformatics in National Development, Dr. H.S. Gour Central University, 29&30 November, Sagar.

### **International**

Nagabhatla N, Dhyani S, Sellamuttu S S, Finlayson M, Wickramasuriya R and Chiranjibi Pattanaik (2010). Participatory environmental governance in multiple resource systems: perspectives on biodiversity conservation, food security and adaptive capacity. Abstract in International Workshop on Biodiversity and Climate Change, IIT Kharagpur, 19-22 December, Kharagpur, p-71.

Pattanaik Chiranjibi and Prasad S N (2010). Climate change and wetlands of India: the present status and future scenario. Abstract in International Workshop on Biodiversity and Climate Change, IIT Kharagpur, 19-22 December, Kharagpur, p-46.

Pattanaik Chiranjibi and Prasad S N (2010). Climate change and wetlands of India: The future scenario. Abstract in International Conference on Climate Change and Environment (ICCCE), CUSAT, 24-26 October, Kochi, p-194-195.

Pattanaik Chiranjibi (2010). E-discussion on Biodiversity and Gender in the Hindu-Kush Himalayas, 03-21 May, International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal.

Pattanaik Chiranjibi, Prasad S N, Reddy C S and Roy P S (2010). Bioprospecting of medicinal plant resources in Orissa: A remote sensing and GIS perspective. Abstract in First International Conference on Conservation, Marketing and Patenting of Medicinal Plants (ICCMP), Council for Tribal & Rural Development, 14&15 March, Raipur, p-48.

Radhakrishna S, Kumara H N and Sinha A (2010). Distribution and Conservation status of Slender Loris in India. Paper presented at the 23rd Congress of the International Primatological Society (September 2010), Kyoto, Japan.

Radhakrishna S, Kumara H N and Sinha A (2010). 'Living in human-dominated landscapes: Boon or bane for the Slender Loris?' Abstract in Quest for Coexistence with Non-human Primates. Proceedings of the ASIAN-HOPE 2010, IPS Pre-Congress Symposium and Workshop, Inuyama, September 2010, p. 27.

### III Books

- Balasubramanian P, Ojha R K and Anand Naik KG (2010). Bird–dispersed plants for afforestation. Salim Ali Centre for Ornithology and Natural History, Coimbatore, p64.
- Pramod P (2010). Biodiversity : Observations & study projects Publishers: Malabar Natural History Society, Calicut ( in Malayalam).
- Pramod P, Shashikular C, Palot M J and Uthman KV (In Press). Bird of Aralam Wildlife Sanctuary, Kerala – A long study with Ecological approach'Publishers : Department of Forests and Wildlife Kerala.

### IV.Chapter in books

- Bhupathy S and Reena Mathur (In Press). Chelonian status and Conservation in Rajasthan. In: Faunal Heritage of Rajasthan: Ecology and Conservation. (Eds.) B K Sharma et al. Springer Publication.
- Das I and Bhupathy S (2010). *Geodemys hamiltonii* (Gray 1830) – Spotted pond turtle, black pond turtle. In: Rhodin, A.G.J., Pritchard, P.C.H., van Dijk, P.P., Saumure, R.A., Buhlmann, K.A., Iverson, J.B., and Mittermeier, R.A. (Eds.). Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group. Chelonian Research Monographs No. 5, pp. 043.1–043.6, doi:10.3854/crm.5.043.hamiltonii.v1.2010,http://www.iucn-tftsg.org/cbftt/.
- Pattanaik Chiranjibi, Shakya S, Ravindar T, Prasad S N, Vijay Lakshmi T and Manikya Reddy P (2011). Mapping and monitoring spatial dynamics of Chilika lake (Ramsar site), Orissa using remote sensing and GIS. Paper accepted in Natural Resource Conservation and Management book.
- Pattanaik Chiranjibi, Yadagiri G, Prasad S N and Manikya Reddy P (2011). Monitoring Land use and Land cover change in Gandhamardan hill range, Orissa using remote sensing and GIS. Paper accepted in Forest Resource: Need Conservation for Sustainable Livelihood and Development book.
- Book Chapters for PG Diploma in Sustainability Science, Indira Gandhi National Open University, New Delhi
- Chandra R, Prusty BAK and Azeez PA (2010). Biothreats. Course on Challenges to Sustainable Development: Threats.
  - Prusty BAK (2010). EIA, SIA, Environmental Auditing and ISO 14000/14001: Assessment tools for Sustainable Development in India. Course on Public Policy Tools: Assessment Tools.
  - Prusty BAK (2010). Land Degradation as a threat to Sustainable Development in India. Course on Challenges to Sustainable Development: Threats.
  - Prusty BAK and Chandra R (2010). Desertification and Dry land sustainability. Course on Challenges to Sustainable Development: Threats.



- Prusty BAK and Chandra R (2010). Overpopulation and resource depletion. Course on Challenges to Sustainable Development: Global Environmental Issues.

Prusty BAK (2011). Energy Crisis. Course on Challenges to Sustainable Development: Global Environmental Issues.

### **V. Newsletter**

Ramesh and Bhupathy S (2010). A report on the unusual body weight of a hatchling Python *molurus molurus*. Reptile Rap. 10:22-23.

### **VI. Reports**

Balasubramanian P (2011). Monitoring and evaluation of Loktak Lake Management Project: wetland ecology component. Report submitted to the Karunya University, Coimbatore p31.

Bhupathy S and Ramesh C (2010). Ecology of the Endangered Indian Rock Python (*Python molurus*) in Keoladeo National Park, Bharatpur, Rajasthan, India. Final Report Submitted to the Ministry of Environment and Forests, Government of India. 87pp.

Kumara H N and Rathnakumar S (2010). Distribution and abundance of large mammals in Biligiri Rangaswamy Temple Wildlife Sanctuary. Technical report submitted to Karnataka Forest Department, Chamarajanagar Wildlife Division, Chamarajanagar, Karnataka, India.

Kumara H N, Sathagirish M K, Sadananda K B and Shivaprakash A (2010). Preparation of biodiversity conservation plan for Mysore Forest Division. Technical report submitted to Karnataka Forest Department, Mysore Forest Division, Mysore, Karnataka, India.

### **VII. Popular Articles**

Jayakumar S (2011). Chittukkuruvigal Vaazhvum Azhivum. Ilaingar Muzhakam. 24-25.

Jayakumar S (2010). Patthupatil Neerparavaigal. Muthamizh Avayam: Manmuga Nokill Tamizh. 486-489.

Jayakumar S (2010). Pathittruppathil Naraigal. Pathittruppathu Aaivukkovai. 739-742.



# Infrastructure

SACON's location at Anaikatty with the backdrop of the Western Ghats, one of the 'hot spots' of biodiversity in the world, offers great opportunities for long-term studies on avifauna, other wildlife and on biological principles of ecosystems.

**Laboratory Facilities:** Some of the basic equipments SACON laboratory has at present are listed below. 1) UV Spectrophotometer, Perkin Elmer Model Lambda, (2) HPLC Agilent Technology Model 1100 series with DAD and Florescence detector, (3) Ultra Deep Freezer (-80° C), New Brunswick, (4) Flame Atomic Absorption Spectrophotometer (AAS) Perkin Elmer, Model 3300 with 13 lamps for analyzing metal residues, (5) Graphite Furnace Atomic Absorption Spectrophotometer for analyzing metal residues, (6) Mercury Hydride Generator for AAS, Perkin Elmer for analyzing mercury and other hydride forming elements, (7) Gas Chromatograph, Hewlett Packard Model 5890 Series II with three detectors, (Electron Capture Detector - ECD, Nitrogen Phosphorous Detector -NPD and Flame Photometric Detector –FPD) for analyzing pesticide residues and organic pollutants, (8) Microwave Digestion System, Milestone Model 1200 for digesting samples for analysis in the AAS, (9) Dissolved Oxygen (DO) Analyzer, (10) Biochemical Oxygen Demand (BOD) Incubator, (11) Flame Photometer, (12) Vertical Laminar Flow Chamber, (13) Respirable Dust Samplers for sampling suspended particulate matters (SPM) and Respirable particulate matters, Oxides of Nitrogen (NOx) and Sulphur (SOx), (14) Ultra Centrifuge, (15) Walk-in cold room, (16) Rotary Flask Evaporator, (17) Micrometer, (18) Digital Camera, (19) Thermo-hygrometer, (20) All Quartz Double Distillation unit, (21) Millipore water purification system, and (22) Water Quality analyzer– Multi Parameter TROLL – 9500, (23) Hot-air Oven, (24) Binoculars, (25) Induction Hot Plate, (26) Digital Caliper, (27) Deep Freezer, (28) Soxhlet Mantle, (29) Multi parameter PCS tester and (30) Desiccators.

**Computer facilities:** SACON has acquired round-the-clock uninterrupted Broadband (Dataone BSNL) internet connectivity with a speed of 512 kbps -2 mbps connected through a Local Area Network and inter-division wireless connectivity. Scientists of SACON are provided with laptop computers, desktops and printer. All research and administrative divisions of SACON are provided with desktop computers, printers, scanners and software. Three 10 KVA UPS having three hours power backup supports all Computers.

### **Library and Documentation:**

Resources available in the SACON library as on March 2010 is given below:

Total no. of books: 3245

Total no. of Back Volumes: 2508

Maps: 2706

CD/DVDs: 91

SACON Project Report: 77

Ph.D. Thesis: 29

Current Periodicals: 65 (National -40; International – 25)

Online Subscription: JSTOR Archive: Biological Science.

Facility for literature searches through the internet has been provided to the staff and students. As in previous years, library facilities were also used by more than a thousand PG students, research scholars and scientists from other institutions.



