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Education : Bachelor of Science 1977, University of Madras

Master of Science 1979, University of Madras

Doctor of Philosophy 1985, Indian Institute of Science

Positions held : Professor, Centre for Ecological Sciences, Indian Institute of Science (IISc.) (2003- present). Faculty since 1986 at the same Institute.

Associate Faculty, Divecha Centre for Climate Change, IISc. (2009-)

Adjunct Faculty, Columbia University (2001-present)

Fulbright Fellow, Princeton University (1991-92)

Specialization : ECOLOGY AND CONSERVATION BIOLOGY

- *Wildlife Ecology* (Asian elephant ecology and management; Population dynamics; Wildlife-human conflicts)
- *Tropical forest ecology* (Diversity, structure and dynamics of tropical forests; Conservation of tropical forests)
- *Climate change* (Reconstructing Quaternary climate change; Assessing impacts of future climate change on forests and biodiversity)

Institutional affiliations : Managing Trustee, Asian Nature Conservation Foundation, Bangalore

Trustee, Wildlife Trust of India, New Delhi

Research and Conservation Experience

- 1975 – 1979 : *Research on the flora and fauna of Guindy National Park, Madras*
- I began my natural history pursuits in the city of Madras by studying the ecology of this remnant jungle and contributed in a small way to its eventual recognition as a national park.
- 1980 – 1985 : *Study of the ecology of Asian elephants and elephant-human conflicts in southern India*
- This research was part of the Ph.D programme and focused on elephant-human conflicts in relation to the natural ecology of elephants in the Biligirirangan hills in southern India. It is recognized as not only a pioneering scientific study of wild Asian elephants but also as the first to address in depth the ecological basis of conflict between a large mammal and humans.
- 1985 – 1988 : *Survey and design of the Nilgiri Biosphere Reserve, southern India*
- Carried out field surveys and helped design the Nilgiri Biosphere Reserve, a 5500 sq. km reserve that is the country's first biosphere reserve. As part of this conservation programme I also formulated research programmes and set up an information system pertaining to the Nilgiri Biosphere Reserve for the Department of Environment, Government of India. Several long-term research projects that interface with conservation and management were also set up, some of which are described below.
- 1988 – present: *Monitoring the large mammal populations of Mudumalai*
- Set up a long-term monitoring system using line transects of the population dynamics of large mammals in Mudumalai Sanctuary, a part of the Nilgiri Biosphere Reserve. This includes a study of predation patterns of the dhole (Asiatic wild dog), assessing the population structure and numbers of herbivores (elephants, gaur, spotted deer and sambar) and modelling the dynamics of their interactions.
- 1988 – present: *Dynamics and management of tropical forests*
- Beginning in 1988 a number of permanent plots have been set up in the Nilgiri Biosphere Reserve for long-term monitoring of the dynamics of forest communities in relation to climate, fire, impact of elephants and human disturbances. These plots monitor the fate of about 50,000 individual trees from about 300 species and is the largest and longest running programme of its kind in India. The Centre for Tropical Forest Science of the Smithsonian Institution is a collaborator in this work.
- 1988 – present: *Monitoring ivory poaching and the dynamics of Asian elephant populations*
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Long-term monitoring of the population dynamics of Asian elephant populations is being carried out at three sites (Mudumalai, Nagarahole, Periyar) in southern India including two within the Nilgiri Biosphere Reserve, and the impact of ivory poaching is being assessed.

1999 – 2005 : *Reconstructing past climate change in southern India*

The past climate and vegetation of the Nilgiri Hills, going back to the late Quaternary (about 40,000 years before present), has been studied through stable carbon and oxygen isotope analyses of peat bogs on the plateau.

1995 – present: *Impact of future climate change on forests and biodiversity in India*

The potential impact of future climate change on forests in the India is being assessed through models integrating global and regional climate change projections with vegetation change models. The implications of such change during the 21st century for protected areas and wildlife conservation is also being assessed.

1993 – 1996 : *Survey and conservation of elephants in Myanmar*

Over a three year period several surveys were carried out of the extensive elephant habitats in the Pegu Yoma and Arakan Yoma range in Myanmar. These surveys provided some of the first objective estimates of the elephant population of the country. As a result of this work the country set up its first elephant sanctuary, the Gwa Elephant Sanctuary, in 1997.

2000 – 2001 : *Survey and conservation of elephants in Cat Tien NP, Vietnam*

During 2000 training in field training methods was provided to staff of the Cat Tien National Park, and a detailed survey of the remnant elephant population of the park carried out during 2001 with a view to providing an action plan for its conservation.

1999 – 2005 : *Molecular genetics and phylogeography of Asian elephant populations*

A comprehensive study of population genetic structure, variation and phylogeography of Asian elephant populations through extracting DNA from dung was carried out for Indian and Myanmar elephants. This study provided the much needed data for the two major populations of this species in order to derive the evolutionary relationships among Asian elephant populations across the continent.

2001 – present: *Radio-telemetry and GPS monitoring of elephants in West Bengal, India*

A detailed study of elephant ecology is being carried out in the state of West Bengal that experiences one of the highest levels of elephant-human conflict in Asia. Under this study eleven elephants have been fitted with radio-collars to study their movement, use of corridors and patterns of conflict with human settlements across a fragmented landscape. The novelty of this study has been the first “satellite-collaring” of an elephant in the country; three elephants in

conflict with villagers now serve as prototypes for an internet-based “early warning” system for field managers of the movement of troublesome elephants.

2008 – present: *Ecology and mitigation of wildlife-human conflicts*

I have been coordinating a multi-institutional and comprehensive research programme on wildlife-human conflicts under a joint Indo-Norwegian initiative. Aspects covered include the ecological and social dimensions of conflict of humans with several species of herbivores (elephant, blackbuck, nilgai, wild pig) and carnivores (leopard, wolf) across the country. The study will also make cross-cultural comparisons of wildlife-human conflicts in India and Norway.

Teaching, Training and Lectures

I have taught courses on Ecology and Conservation Biology for graduate students since 1986.

Have also undertaken training programmes for forest/wildlife department personnel from Asian countries including India, Bangladesh, Myanmar, Vietnam, Malaysia, Indonesia and China.

I have also spoken extensively on conservation issues relating to Asian elephants at venues around the world including:

Zoos & Zoological Societies:

San Diego Zoo, Los Angeles Zoo, Oakland Zoo, Minnesota Zoo, Brookfield Zoo, Lincoln Park Zoo, Syracuse Zoo, Bronx Zoo, National Zoo (DC), Philadelphia Zoo, Jacksonville Zoo, Riddle’s Elephant Sanctuary, Rotterdam Zoo, Emmen Zoo, Munster Zoo, Chester Zoo, Zoological Society of London, Melbourne Zoo.

Universities:

University of California at San Diego, Davis and Berkeley, Stanford University, Pasadena Institute of Technology, University of Minnesota, University of Wisconsin, Princeton University, Columbia University, Cornell University, Boston University, University of Massachusetts, University of Florida, University of Oxford, University College-London, University of Zurich, University of Kiel, Yale University, University of Michigan

Congresses & Symposia:

Major international meetings/symposia in which I have made presentations include the Society for Conservation Biology, Association for Tropical Biology, International Congress of Ecology, International Congress of Mammalogy, Elephant Keeper’s Association of North America, and International Elephant Foundation.

Awards and Honours

- National Science Talent Award, National Council for Educational Research and Training, 1973.

- Presidential Award of the Chicago Zoological Society, 1991.
- Order of the Golden Ark, The Netherlands, 1997.
- Fellow of the Indian Academy of Sciences, (elected in 2000).
- Whitley Gold Award for International Nature Conservation, U.K., 2003.
- TN Khoshoo Memorial Award for Conservation, India, 2004 (first recipient of this award).
- Fellow of the Indian National Science Academy (elected in 2005).
- UGC National Swami Pranavananda Saraswati Award in Environmental Science and Ecology, 2006.
- International Cosmos Prize, Japan, 2006.
- Fellow, Geological Society of India (elected in 2006).
- B.P. Pal National Environment Fellowship Award for Biodiversity, India, 2007.
- Commendation by the Prime Minister for contributions to the Intergovernmental Panel on Climate Change (IPCC) that shared the Noble Peace Prize, 2007.
- J.C. Bose National Fellow, Department of Science & Technology, India (2010-15).
- Karuna Award for Contributions to National Development, Karuna Trust, Bangalore, 2010.
- Taru Lalvani Award for Protection of the Environment, Rotary Club of Bombay (2011).
- Doctor of Science (*Honoris causa*), Vidyasagar University, West Bengal, 2012.

Membership of Key Professional and Advisory Bodies and Committees

- Deputy Chair, IUCN/SSC Asian Elephant Specialist Group (1988 -1996), and
Chair, IUCN/SSC Asian Elephant Specialist Group (1997 - 2004)

As Deputy Chair, I provided key support to the Chair of the group in providing the scientific framework for field methods and organizing training programmes for estimating elephant populations in forests, and setting up of a field survey project in Myanmar. This was also a period when I lectured extensively worldwide on the plight of the Asian elephant and the urgent need to launch projects for their conservation.

During my chairmanship of the group, some of the key achievements were providing technical inputs to setting up CITES/MIKE (Monitoring the Illegal Killing of Elephants) as mandated by the Conference of Parties to CITES (at Harare in 1997), revising the Asian Elephant Action Plan (along with Deputy Chair, Charles Santiapillai and several members of the group), and organizing

a major meeting in Cambodia that brought international focus on the plight of Asian elephants in Indo-China.

- Member, IUCN/SSC Conservation Breeding Specialist Group (1990 - 2003);

As a member of this group I helped carry out several of the early PHVAs (Population and Habitat Viability Analysis) for species such as the Lion-tailed macaque, Sumatran rhino, Asiatic One-horned rhino and Asian elephant (in Sumatra).

- Member, Technical Advisory Group, Monitoring the Illegal Killing of Elephants, CITES (2001-present)

As a member of this group I have provided technical inputs to setting up the monitoring programme, particularly in Asia.

- Contributor, Intergovernmental Panel on Climate Change (1996 - 2007)

I have been part of various exercises of the IPCC including the 2nd Assessment Report (1996), the Special Report on Land-use, Land-use change and Forestry (2000), and the ongoing 4th Assessment (to be completed in 2008).

- Member, Indian Board for Wildlife, Government of India (1996 - 2003)

The board is the apex policy making body for wildlife conservation in the country and is chaired by the Prime Minister of India. As a member of this board for two terms I have contributed to decision-making on several conservation issues.

- Member, Project Elephant Steering Committee, Government of India (1992-2007, 2012-present)

I was a member of the task force set up in 1989 by the Indian government to prepare the blueprint for the country's Project Elephant, a conservation project that aims to protect elephants and its habitat in eleven landscapes across the country. Since its launch in 1992 I have been a member of the steering committee that sets policies and oversees their implementation. In this capacity I have been the coordinator for the southern Indian region and have worked closely with the forest/wildlife departments of the southern states of Karnataka, Tamilnadu and Kerala in the conservation and management of elephant populations.

- Member, National Tiger Conservation Authority, Government of India (2006-08)
- Chairman, Training, Research and Academic Council, Wildlife Institute of India (2011-present)
- Member, Western Ghats Ecology Expert Panel, Government of India (2010-11)
- Chairman, Karnataka Elephant Task Force (appointed by Karnataka High Court), 2012

Served as a member of various other advisory and selection committees including:

- a) Ecosystem Research Committee (Ministry of Environment and Forests, Government of India 2000-),

- b) Project Advisory Committee for Animal Sciences (Department of Science and Technology, Government of India 1995-1998, 2012-present).
- c) Governing Body of the Wildlife Institute of India, Dehra Dun (2001-present).
- d) Expert Group for Coordinated Research in Eastern & Western Ghats Regions, Ministry of Environment and Forests, Government of India (2003-2006).
- e) Governing Council of the Salim Ali Centre for Ornithology and Natural History, Coimbatore (2004-2012).
- f) Research Advisory Council of Kerala Forest Research Institute, Peechi (2003-present).
- g) Scientific Advisory Committee of Vivekananda Institute of Tropical Mycology (VINSTROM) (2005- present).
- h) Selection Committee for scientist, Salim Ali Centre for Ornithology and Natural History (2009-).
- i) Selection Committee for Director, Salim Ali Centre for Ornithology and Natural History (2009-2012).
- j) Contribution to India's National Communication on the UN Framework Convention on Climate Change (2006-2008).
- k) Assistance to Project Elephant Directorate, Ministry of Environment and Forests, in implementing CITES MIKE (Monitoring the Illegal Killing of Elephants) programme (2006-).
- l) National Board for Wildlife sub-committee for rationalization for National Parks and Wildlife Sanctuaries (2006-2009).
- m) Committee for examining the suggestions made in the Tiger Task Force and the Special Investigation Team of the CBI relating to the Wildlife (Protection) Act (2006-present)
- n) Expert non-official member for suggesting infrastructure enhancement in priority protected areas including tiger reserves for considering in the XIth Plan (2006-).
- o) Reconstitution of Career Assessment Panel (CAP), Salim Ali Centre for Ornithology and Natural History, Coimbatore (2006-2012).
- p) Committee for Management Effectiveness Evaluation (MEE) of the Protected Area Network in India (2006-2009).
- q) Working Group on Wildlife, biodiversity, traditional knowledge, and animal welfare for the Environment & Forests Sector for the 11th 5-year Plan (2006-present).
- r) Committee for selection of Dr. Salim Ali National Wildlife Fellowship, 2005.
- s) Shri Kailash Sankhla National Wildlife Fellowship, 2006, 2012, 2013.
- t) Expert member in the National Tiger Conservation Authority (2006-2009).
- u) Member, Technical Support Group for framing Rules under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2007-).
- v) Member, Expert Committee on Climate Change to study the impact of climate change in India, MoEF, New Delhi (2007-2010).
- w) Member, Administrative Committee of the National Tiger Conservation Authority (2006-2009).
- x) Member, Expert Committee of elephant deaths due to train accidents, MOEF, New Delhi. (2008-).
- y) Member, Expert committee on preparing guidelines on ameliorative measures for biodiversity rich areas threatened by overuse, abuse or neglect, National Biodiversity Authority, Gol, Chennai. (2009-2010).
- z) Member, Standing Advisory Committee for Atmospheric Research and Climate Change (SAC-ARCC), MOEF, New Delhi. (2009-2012).
- aa) Member, Expert Committee for finalizing the proposal to converting existing Environmental Protection Training and Research Institute (EPTRI), Hyderabad into National Environmental Protection Training and Research Institute (NEPTRI), MoEF, New Delhi. (2009-).
- bb) Member, Indian National Man and Biosphere (MAB) Committee, MoEF, New Delhi. (2010-2013).
- cc) Member, Expert Group-B on Conservation and Sustainable Utilization of Natural Resources, MoEF, New Delhi. (2010-2013).
- dd) Member, Research Council of National Botanical Research Institute, Lucknow. (2010-2013).

- ee) Research Advisory and Monitoring Committee, Zoological Survey of India (2010-2012)
- ff) Member, National Committee for India-IIASA Programme (2011- present).
- gg) Member, Constitution of a Working Group on Ecosystem resilience, Biodiversity and Sustainable Livelihood for the 12th Five Year Plan, Planning Commission, E&F Division, New Delhi. (2012-2017).
- hh) Member, Constitution of a sub-group on Climate Change under the Working Group and Climate Change for the 12th Five Year Plan, Planning Commission, E&F Division, New Delhi. (2012-2017).
- ii) Member, Technical Committee for facilitating organization of the E-50:50 Meet, MoEF, New Delhi. (2011-).
- jj) Search-cum-selection committee for Vice Chancellor of TERI University, New Delhi (2012).
- kk) Expert, Multidisciplinary Expert Panel of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), MoEF, New Delhi. (2013-).
- ll) Member, High level working group for consideration of recognition/accreditation of institutions with a view to bringing objectivity and efficiency in wildlife management. MoEF, New Delhi. (2013-).

The author of four books on elephants and around 100 scholarly publications in the area of elephant biology, tropical forest ecology, climate change and nature conservation.